Appendix A

SOCIO ECONOMIC

May, 2001

2001 RTP Technical Appendix

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Socio-Economic

A. CHRONOLOGY OF 2001 RTP SOCIOECONOMIC FORECAST DEVELOPMENT

April 1998: Regional Council adopted a regional/subregional forecast, through the year 2020, as a part of the 1998 Regional Transportation Plan (RTP). The methodology for the 1998 RTP Socioeconomic Forecast is contained in Appendix __. In addition, the following procedure (contained in Appendix) was utilized for developing the regional household projection: 1.) Population projection was made using cohort-component model. Projected population is available by age, sex, race/ethnicity for the forecast periods; 2.) headship rates by age and race/ethnicity were projected utilizing the following two assumptions: the trend of headship rate by age and by race/ethnicity between 1980 and 1990 was considered and the difference in headship rates between White and other ethnic groups (Asian and Hispanic) will converge over time; 3.) the projected headship rates were applied to projected population by age and race/ethnicity to derive a projection of future households and 4.) local review.

June 1998: Forecasting Technical Task Force, comprised of technical planning staff from each subregion, was formed to assist in the process by providing technical and policy input. Policy Committees of the Regional Council are periodically informed of progress and provide direction to the program through the actions they take.

September 1998: Preliminary regional/small area forecast was developed for local review, reflecting the change of the base year from 1994 to 1997, with the 2020 regional/small area forecast kept constant.

- Ç First, regional growth forecast for the interim years (2000-2015) and 2025 was developed using an interpolation/extrapolation method.
- Ç Second, county growth forecast for the interim years (2000-2015) and 2025 was developed using county's share of regional growth (for example, for 2000-2015, the county's share of region's growth between 1997 and 2020 was used; for 2025, the county's share of region's growth between 2015 and 2020 was utilized).
- Ç Third, the subregional growth forecast of the interim years (2000-2015) and 2025 was developed using the subregional share of county growth (for example, for 2000-2015, the subregional share of county's growth between 1997 and 2020 was used; for 2025, the subregional share of county's growth between 2015 and 2020 was utilized).
- Ç Fourth, city growth forecast for the interim years (2000-2015) and 2025 was developed using the city's share of subregional growth (for example, for 2000-2015, the city's share of subregional growth between 1997 and 2020 was used; for 2025, the city's share of subregional growth between 2015 and 2020 was utilized)

September/October 1998 – March/May 1999: Feedback from subregions was received from September 1998 to March 1999 for the 2005 household forecast. Feedback for the long term forecast was completed in May 1999.

May 1999: 2005 household forecast for Regional Housing Needs Assessment was finalized and approved by Community, Economic and Human Development Committee. The short term forecast covering 2000 and 2005 has not changed since May 1999.

December 1999: A Long Range Forecast Workshop was held to review assumptions regarding job growth in the SCAG region. Papers presented by two noted regional economists: Mr. Stephen Levy of the Center for the Study of the California Economy (CCSCE) and Dr. John Husing of Economics and Politics, Inc. evaluated the assumptions regarding job growth in the SCAG region. Mr. Levy's finding was that due to the aging of the baby boom generation, U.S. job growth is expected to slow after 2005. Between 2020 and 2025, most of the working age population growth will be over 65 (prime retirement years). This will push down the U.S. labor

force participation rate and growth of total U.S. jobs (according to Bureau of Labor Statistics projections) after 2005. CCSCE assumed slightly higher labor force participation rates resulting in a higher U.S. job growth over the 2005-2020 period.

Mr. Levy also examined the SCAG share of U.S. job growth as part of his analysis. The adopted 2020 regional jobs forecast of 10,573,800 was derived by assuming that the region would capture 15.3% of the 15.5 million U.S. job growth between 2005 and 2020. This is a higher capture rate than has ever occurred in the SCAG region and the share was therefore adjusted downward to 7.8%. This resulted in a regional total of 9.5 million jobs in 2020. He also made a number of recommendations regarding economic and demographic relationships including a population/job ratio of 2.25 for the year 2020. Dr. Husing presented the results of his analysis that are consistent with the CCSCE findings. Copies of both analyses are included as appendices.

January 2000: As discussed at the forecasting workshop held in December 1999, the new 2020 regional job forecast was developed using the regional share (7.8%) of projected national job growth between 2005 and 2020. The 2020 regional population forecast was developed using a population to job ratio of 2.25, 21.5 million population (849,000 lower than 1998 adopted forecast) and 9.5 million jobs (1 million jobs lower than 1998 adopted forecast). Using the share of growth method based on the growth between 2015 and 2020 and population to jobs ratio (2.31), 2025 forecasts were also developed for population (23 million) and employment (10 million).

February 2000: A new small area forecast was developed adjusting local input population and the 1998 adopted employment forecast.

- First, population was reduced from local input population by multiplying shares of the 2005-2020 population growth at the subregional/city level by the difference (219,000) between local input population and the 1998 adopted population forecast.
- Second, employment was reduced from the 1998 adopted forecast by 1) applying a county ratio of non-basic jobs to 1998 adopted population forecast at the subregional/city level (this results in the reduction of 170,000 jobs from the 1998 adopted forecast) 2) and multiplying shares of the 2005-2020 adopted job forecast at the subregional/city level by additional jobs to be reduced (860,000 jobs = 1.03 million jobs – 170,000 jobs))

February 2000 – October 2000: New small area forecast was sent to subregions and cities for their review and input in February 2000. Feedback from subregions and cities was completed in October.

September 2000-October 2000: SCAG requested additional analysis by CCSCE and John Husing on the local input on employment growth. Steve Levy of CCSCE recommended that previously adopted regional totals should not be changed although redistribution between counties may be considered. Dr. Husing evaluated local input from the Inland Empire and concluded that additional employment growth was likely but not at the levels requested by local governments. They presented their findings to the October 2000 CEHD meeting. Copies of their analyses are included in Appendix ___.

SCAG staff evaluated historical trends in employment growth and the share of regional employment for each of the six counties in the SCAG region. SCAG looked at California Employment Development Department (EDD) data for the period between 1972 and 1999 at the one digit SIC level. Regression analysis was then utilized to project these historical trends into the future. The results of the analysis indicated that the regional employment control totals were accurate and should not be changed, that the employment share for the Inland Empire could be adjusted upward, that the Los Angeles County share and forecast was too high and that the Orange County share was too low and could be adjusted upward. The Los Angeles County share of regional employment declined from 75% in 1972 to 60% in 1999. The regression analysis indicated that by 2025 the county's share of regional employment would decline to 46%. The recommended forecast assumed that Los Angeles County's share of regional employment would be 53% by 2025.

November 2000: The 2025 County/Subregional population and household forecast was finalized based on local input. The 2025 County/Subregional employment forecast was based on a combination of local input and a detailed regression analysis of historical and projected employment trends. The 2025 County forecast was approved by the Regional Council for analytical purposes. The household forecast for the year 2005 to be used for the RHNA was approved by the Regional Council

April 2001: The 2005-2025 County/Subregional population and household forecast was finalized based on the household forecast for year 2005 and the updated local input. In most cases local input on population and housing at the regional level was within a few percentage points of the preliminary forecast and therefore was utilized. The 2025 County/Subregional employment forecast was developed using the process described above. The 2005-2025 County forecast was approved by CEHD.

B. 2001 BASELINE SOCIOECONOMIC FORECAST

1. DESCRIPTION OF LOCAL INPUT PROCESS

The following is a description of the local input process for the SCAG 2001 Socioeconomic Forecast. On February 9th, 2000, SCAG sent the SED data (mechanical set) to the subregions for review. The review process was completed in October, 2000. Eight subregional council of governments reviewed the SED data at the city and subregional level, and provided subregional input data as whole data sets. In the other 6 subregions, staff worked with the cities to collect input and comments. There was a substantial variation in the type of input received from the various cities. The local input varied from specific numbers to general comments on agreement with the SCAG data. The independent input received directly from cities, lacked consistency and critical subregional analysis. As a result, the individual city input needed adjustment.

1.1 General Methodology

1.1.1 2025 Target-Year Data Development.

Most of the 2025 city input was reasonable based on the FTTF forecast parameters. Therefore, the local input for many cities was used with minor adjustment. However, some city input was adjusted if the input deviated from established reasonable parameters, such the persons per household trend or growth trend. In addition, the local input was adjusted if the 2025 input was not consistent with the 2005 RHNA households. In order to maintain consistency with the 2005 RHNA household totals, it was assumed that household growth would not be lower than RHNA household growth.

1.1.2 Interim Year Data Development.

Interim year data development was a mixture between local input and the subregional growth share method. Each city's input was analyzed individually, based on the identified parameters and the 2005 RHNA household numbers. City input was adjusted if it was not consistent with RHNA requirements. The next step was to aggregate city input data at the subregional level. The aggregated subregional data were evaluated and analyzed and final subregional controls were developed. The final city interim year data were developed by using the subregional growth share method.

1.2 Subregional Data Development

1.2.1 Imperial Valley Association of Governments

IVAG collected and reviewed the local input for its cities and the unincorporated county areas in their subregion and provided input. SCAG incorporated the IVAG population and household input data without any modification.

1.2.2 North Los Angeles County

Cities provided local input individually without subregional coordination. The 2025 population and household input was incorporated without modification. The interim year data were developed by the subregional growth delta method.

1.2.3 City of Los Angeles

Cities provided local input individually without subregional coordination. The 2025 population and household input were incorporated without modification and the interim year data were developed by the subregional growth delta method.

1.2.4 Arroyo Verdugo Association of Governments

Cities provided local input individually without subregional coordination. The 2025 population and household input were incorporated directly and the interim year data were developed by the subregional growth delta method.

1.2.5 San Gabriel Valley Council of Governments

SGVCOG collected and analyzed the local input for its cities and unincorporated county areas. They provided a long-range 2020 and 2025 forecast. SCAG incorporated the SGVCOG population and household input without modification. The interim year data was developed by the subregional growth delta method.

1.2.6 Westside Cities Association of Governments

Cities provided local input individually without subregional coordination. The 2025 population input was incorporated with minor adjustments. The household input was utilized without modification. The interim year data were developed by the subregional growth delta method.

1.2.7 South Bay Cities Council of Governments

Cities provided local input individually without the subregional coordination. The 2025 population and household inputs were incorporated with some small adjustments. The interim year data were developed by the subregional growth delta method.

1.2.8 Gateway Cities Council of Governments

The Gateway Cities COG collected, reviewed and analyzed the local input for its cities and the unincorporated county areas in their subregion. The Gateway Cities COG population and household input for 2025 was adjusted because of an abnormally high persons per household ratio. The Gateway Cities consultant provided strong background information on the general trend of the high persons per household ratio in that area. SCAG incorporated most of the Gateway Cities input and adjusted several cities input where the person per household ratio was very high. The interim year data were developed by the subregional growth delta method.

1.2.9 Las Virgenes, Malibu and Conejo Council of Governments

All of the cities (except Westlake Village) agreed with the SCAG SED data. The Westlake Village household input was incorporated under the condition of not violating the 2005 RHNA household.

1.2.10 Orange County Council of Governments

OCCOG provided SCAG with its comprehensive SED forecast data set. The OCCOG household forecast was not consistent with the 2005 RHNA household totals. Therefore, some adjustments were made based on the RHNA requirements. First, 2025 household input for several cities were adjusted to meet the RHNA requirement if a city's 2025 household input was lower than the RHNA household totals. Because the RHNA household totals were required to be used in the OCCOG data set, some non-monotonic trends occurred. Interim year data were adjusted in order to remove the non-monotonic trends. The original OCCOG county level forecast were incorporated into the RTP 2001 data without change.

1.2.11 Western Riverside Council of Governments

WRCOG collected, reviewed and analyzed the local input for its cities and the unincorporated county areas in its subregion and provided their input. Its long-range 2025 population and household forecasts at the city level were incorporated into RTP2001 forecast without any adjustments. Because the RHNA household totals were required to be used in the WRCOG data set, some unreasonable growth trends occurred. The original WRCOG subregional level forecast was used as the subregional controls and the city level interim years were developed by the subregional growth delta method in order to smooth out the growth trends.

1.2.12 Coachella Valley Association of Governments

The cities provided individual input without subregional coordination. The 2025 population and household inputs were incorporated with some minor adjustments. The interim year data were developed by the subregional growth delta method

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1.2.13 San Bernardino Associated Governments

SANBAG collected, reviewed , and provided local input for its cities and the unincorporated county. SCAG incorporated SANBAG population and household input data without any modification.

1.2.14 Ventura Council of Governments

VCOG collected and reviewed the local input for its cities and the unincorporated county areas in their subregion and provided input to SCAG. SCAG incorporated most of the VCOG population and household input data without any modification. Adjustments were made to the cities of Moorpark and Port Hueneme in order to maintain consistency with RHNA household totals.

2 Population and Household Forecast Methodology

2.1 Background

The development of the growth forecast for the 2001 RTP is driven by a principle of collaboration between the regional agencies, subregions, and local jurisdictions. Each subregion received funding for the development of socio-economic projections at the local level. Integration of the regional and local forecasts was achieved through the joint efforts of a variety of groups. A Forecasting Technical Task Force, comprised of technical planning staff from each subregion, was formed in June 1998 to assist in the process by providing technical and policy input. Policy Committees of the Regional Council are periodically informed of forecast progress and provide policy direction for the forecasting program.

In April, 1998, the Regional Council adopted a regional and small area forecast, extending to the year 2020, as a part of the Regional Transportation Plan. A process, methodology, and assumptions, for developing growth forecasts for 1998 RTP was included in appendix x. The preliminary growth forecasts for 2001 RTP were developed in September 1998. The major difference between the adopted forecasts (April 1998) and the preliminary forecasts (September 1998) was a change in the base year from 1994 to 1997 and a resulting adjustment of growth forecasts during the interim years, particularly 2000 through 2015. The preliminary growth forecasts were reviewed by the local jurisdictions between October 1998 and July 1999.

New small area forecasts were prepared based on the local input process. SCAG reviewed the local input using parameters such as historical/future trend of household size, and jobs/household ratio. It was emphasized that the smooth, reasonable, and consistent pattern of future growth and relationship between households, and employment be maintained for the input data base.

During this local input process, 2005 households were finalized for the draft RHNA in May 1999. As a result of the appeal process, SCAG adopted the 2005 household forecast for the final RHNA in November, 2000.

In January 2000, the new 2020 regional job forecast was developed using the regional share (7.8%) of projected national job growth between 2005 and 2020. The 2020 regional population forecast was developed using the population to job ratio (2.25); a population of 21.5 million (849,000 lower than 1998 adopted forecast) and a total of 9.5 million jobs (1 million jobs lower than 1998 adopted forecast).

The new lower population forecast for 2020 is justified based on a recent decreasing trend of natural increase. Natural increase averaged 185,000 annually during the 1994-1997 period, which was 35,000 lower than the previous assumption of natural increase for the1998 RTP. The 2025 forecasts for population (23 million) and employment (10 million) were developed using a regional growth share method (for growth between 2015 and 2020) and population/jobs ratio of 2.31.

In February 2000, new small area forecasts were sent to the subregions and cities for their review and input. Feedback from the subregions and cities was completed in October.

In November 2000, the 2025 regional/county/subregional population and household forecast was finalized based on the local input. The 2025 County forecast was approved by the Regional Council for analytical purposes.

In April 2001, the 2005-2025 regional/county/subregional population and household forecast was finalized based on the RC approved 2005 household forecast and the updated local input. In most cases local input on population and housing at the regional level was within a few percentages of the preliminary forecast and therefore was utilized. . The 2005-2025 County forecast was approved by CEHD. The following is of a description of how SCAG developed the growth forecast following the completion of a local input in October 2000.

2. 2 Population (resident population, institutionalized group quartered population, non-institutionalized group quartered population)

2.2.1 Total Population

Regional population forecasts were finalized based on an interaction between top down and bottom up processes. The 2025 regional/county/subregional population forecast was finalized based on the local input, historical growth trends, household size trends, projected natural increase, projected migration and the job forecast developed in November 2000.

$$POP_{t_{2025}}^{region} \mid f \text{ (local input, historical growth trend, household size trends, projected natural increase, projected migration, job forecast)}$$

Most local input on population for the intermediate year forecasts between 2010-2020 at the regional level was within a few percentage points of the preliminary forecast and therefore was utilized . If there were no city input, fluctuating population growth trends and/or unstable household size trends, during the 2005-2025 period, SCAG developed a more reasonable city population using the regional/county/subregional growth share method*. Population forecasts developed for different geographical levels were evaluated by using parameters such as household size and were adjusted appropriately.

* The regional/county/subregional growth share method is one of the interpolation methods, which allows the development of a consistent population growth forecast for a smaller area, controlled to a larger area's population during the forecast. For example, if a subregion experienced 10% of its 2005-2025 population growth between 2005 and 2010, then all cities in the subregion receive 10% of their 2005-2025 population growth between 2005 and 2010.

¢# The regional growth share method was used to compute intermediate year forecasts for each county within a region.

$$POP_{t_i}^{county} \mid POP_{t_{2005}}^{county} \; 2\,(D_{t_{(20054\,2025)}}^{county} / D_{t_{(20054\,2025)}}^{region}) * D_{t_{(20054\,i)}}^{region},$$

where

$POP_{t_i}^{county}$ = county population for an intermediate forecast year i (for instance, 2010, 2015, 2020)

$POP_{t_{2005}}^{county}$ = county population for a base year (2005)

$D_{t_{(20054\,2025)}}^{county}$ = county population delta between a base year (2005) and a target year (2025) $D_{t_{(20054\,2025)}}^{region}$ = regional population delta between a base year (2005) and a target year (2025) $D_{t_{(20054\,i)}}^{region}$ = regional population delta between a base year (2005) and intermediate forecast year i

¢# The county growth share method was used to compute intermediate year forecasts for each subregion within a county.

$$POP_{t_i}^{subregion} \mid POP_{t_{2005}}^{subregion} \; 2\,(D_{t_{(20054\,2025)}}^{subregion} / D_{t_{(20054\,2025)}}^{county}) * D_{t_{(20054\,i)}}^{county},$$

where

$POP_{t_i}^{subregion}$ = subregional population for an intermediate forecast year i ,

$POP_{t_{2005}}^{subregion}$ = subregional population for a base year (2005)

$D_{t_{(20054\,2025)}}^{subregion}$ = subregional population delta between a base year (2005) and a target year (2025)

$D^{county}_{t_{(20054\,2025)}}$ = county population delta between a base year (2005) and a target year (2025)

$D^{county}_{t_{(20054\,i)}}$ = county population delta between a base year (2005) and intermediate forecast year i

¢# The subregional growth share method was used to compute intermediate year forecasts for each city within a subregion.

$$POP^{city}_{t_i} \mid POP^{city}_{t_{2005}} 2 (D^{city}_{t_{(20054\,2025)}} / D^{subregion}_{t_{(20054\,2025)}}) * D^{subregion}_{t_{(20054\,i)}},$$

where

$POP^{city}_{t_i}$ = city population for an intermediate forecast year i

$POP^{city}_{t_{2005}}$ = city population for a base year (2005)

$D^{city}_{t_{(20054\,2025)}}$ = city population delta between a base year (2005) and a target year (2025)

$D^{subregion}_{t_{(20054\,2025)}}$ = subregional population delta between a base year (2005) and a target year (2025)

$D^{subregion}_{t_{(20054\,i)}}$ = subregional population delta between a base year (2005) and intermediate forecast year i.

2.2.2 Resident Population

The city level resident population is derived by subtracting total group quartered population from total population. The aggregation of city level resident population results in the subregional/county/regional residential population.

$$RES^{city}_{t_{2025}} \mid POP^{city}_{t_{2025}} 4\, GI^{city}_{t_{12025}} 4\, GNI^{city}_{t_{2025}}$$

where

$RES^{city}_{t_{2025i}}$ = projected residential population by city in 2025

$POP^{city}_{t_{2025}}$ = projected total population by city in 2025

$GI^{city}_{t_{2025}}$ = projected institutionalized group quartered population by city in 2025

$GNI^{city}_{t_{2025}}$ = projected non-institutionalized group quartered population by city in 2025

2.2.3 Institutionalized/Non-institutionalized Group Quartered Population

It is assumed that the 1997 city level ratio of total group quartered population to total population based on California Department of Finance population and group quarter population estimates would be constant over time. This ratio would then be applied to the projected total population. The resulting total group quartered population is divided into institutionalzied and non-institutionalized group quartered population by using the ratio of each group quartered population to total group quartered population from the 1990 census. The calculation of institutionalized group quartered population at the city level is shown as follows:

$$GI^{city}_{t_i} \mid (GQ^{city}_{t_{1997}} / POP^{city}_{t_{1997}}) * POP^{city}_{t_i} * (GI^{city}_{t_{1990}} / GQ^{city}_{t_{1990}}),$$

where

$GI_{t_i}^{city}$ = projected institutionalized group quartered population by city in year i

$GQ_{t_{1998}}^{city}$ = estimated group quartered population by city in 1997

$POP_{t_{1997}}^{city}$ = estimated total population by city in 1997

$POP_{t_i}^{city}$ = projected total population by city in year i

$GI_{t_{1990}}^{city}$ = estimated institutionalized group quartered population by city in 1990

$GQ_{t_{1990}}^{city}$ = estimated group quartered population by city in 1990

The non-institutionalized group quartered population can be calculated using the same method. The aggregation of city level resident population results in subregional/county/regional residential population.

2.3 Households (single dwelling occupied households, multiple dwelling occupied households, mobile dwelling occupied households, other dwelling occupied households)

2.3.1 Total Households

Regional household forecasts for 2005-2025 were finalized based on an interaction between top down and bottom up processes. The 2025 regional/county/subregional household forecast was finalized based on local input, historical growth trends, projected headship rate and household size trends in November 2000.

$$HHLD_{t_{2025}}^{county} \mid f \text{ (local input, historical growth trend, projected headship rate, household size trends)}$$

where

$HHLD_{t_{2025}}^{county}$ = projected total households by county in 2025

Most local input on households for the intermediate year forecasts between 2010-2020 at the regional level was within a few percentage points of the preliminary forecast and therefore was utilized . If there was no city input, fluctuating population growth trends or unstable household size trends, during the 2005-2025 period, SCAG developed a more reasonable city household estimate using the regional/county/subregional growth share method (see the population section). Household forecasts developed for different geographical levels were evaluated by using parameters such as household size and were adjusted appropriately.

2.3.2 Single Dwelling Occupied Households

2.3.2.1. County

The single dwelling households are projected based on a county's historical trend of the proportion of single dwelling households between 1980 and 1997. It is assumed that the historical trend of the proportion will slow down over time during the forecast periods.

$$\%SDO_{t_{2025}}^{county} \mid [[(\%SDO_{t_{1997}}^{county} / \%SDO_{t_{1980}}^{county}) / (t_{1997} \; 4 \; t_{1980})] * 0.75] * (t_{2025} \; 4 \; t_{1997}),$$

$$SDO_{t_{2025}}^{county} \mid \%SDO_{t_{2025}}^{county} * HHLD_{t_{2025}}^{county}$$

where

$\%SDO_{t_{2025}}^{county}$ = projected proportion of single households to total households by county in 2025

$\%SDO_{t_{1997}}^{county}$ = estimated proportion of single households to total households by county in 1997

$\%SDO_{t_{1980}}^{county}$ = estimated proportion of single households to total households by county in 1980

t_{1997} 4 t_{1980} = number of years between 1980 and 1997

t_{2025} 4 t_{1997} = number of years between 1997 and 2025

$SDO_{t_{2025}}^{county}$ = projected number of single dwelling households by county in 2025

$HHLD_{t_{2025}}^{county}$ = projected total households by county in 2025

2.3.2.2 City

The number of single dwelling households are projected using both city's past historical trend of the proportion of single dwelling households and its historical relationship with the county's historical growth trend. The first step is to calculate the city's relative growth trend by dividing the ratio of past city growth between 1980 and 1997 to county growth between 1980 and 1997. The second step is to multiply the previous city's relative growth trend by the proportion of single household in 1997. The third step is to add the result of the second step to the proportion of projected single hosueholds for a county in 2025. The fourth step is to divide the result of the third step by two. The fifth and last step is to multiply the result of the fourth step to projected households by city in 2025.

$$\%SDO_{t_{2025}}^{city} \mid [[(\%SDO_{t_{1997}}^{city} / \%SDO_{t_{1980}}^{city}) / (\%SDO_{t_{1997}}^{county} / \%SDO_{t_{1980}}^{county})] * \%SDO_{t_{1997}}^{city} \; 2 \; \%SDO_{t_{2025}}^{county}] / 2$$

$$SDO_{t_{2025}}^{city} \mid \%SDO_{t_{2025}}^{city} * HHLD_{t_{2025}}^{city}$$

where

$\%SDO_{t_{2025}}^{city}$ = projected proportion of single households to total households by city in 2025

$\%SDO_{t_{1997}}^{city}$ = estimated proportion of single households to total households by city in 1997

$\%SDO_{t_{1980}}^{city}$ = estimated proportion of single households to total households by city in 1980

$\%SDO_{t_{1997}}^{county}$ = estimated proportion of single households to total households by county in 1997

$\%SDO_{t_{1980}}^{county}$ = estimated proportion of single households to total households by county in 1980

$\%SDO_{t_{2025}}^{county}$ = projected proportion of single households to total households by county in 2025

$SDO_{t_{2025}}^{city}$ = projected number of single dwelling households by city in 2025

$HHLD_{t_{2025}}^{city}$ = projected total households by city in 2025

2.3.3 Multiple Dwelling Occupied Households

The total number of city level multiple dwelling occupied households is derived by subtracting mobile and other households from total households. The aggregation of city level multiple dwelling occupied household results in subregional/county/regional totals of multiple dwelling occupied households .

$$MDO_{t_{2025}}^{city} \mid HHLD_{t_{2025}}^{city} \; 4 \; SDO_{t_{2025}}^{city} \; 4 \; MBO_{t_{2025}}^{city} \; 4 \; OTHER_{t_{2025}}^{city}$$

where

$MDO_{t_{2025}}^{city}$ = projected number of multiple dwelling households by city in 2025

$HHLD_{t_{2025}}^{city}$ = projected number of total households by city in 2025

$SDO_{t_{2025}}^{city}$ = projected number of single dwelling households by city in 2025

$MBO_{t_{2025}}^{city}$ = projected number of mobile dwelling households by city in 2025

$OTHER_{t_{2025}}^{city}$ = projected number of other dwelling households by city in 2025

2.3.4 Mobile/Other Dwelling Occupied Households

The city level mobile/other dwelling occupied households were developed using the ratio of mobile/other dwelling occupied households to total households from the 1990 census with the 1990 ratio held constant over time. The aggregation of city level of mobile/other dwelling occupied households results in subregional/county/regional totals of mobile/other dwelling occupied households..

$$MBO_{t_{2025}}^{city} \mid \%MBO_{t_{1997}}^{city} * HHLD_{t_{2025}}^{city}$$
$$OTHER_{t_{2025}}^{city} \mid \%OTHER_{t_{1997}}^{city} * HHLD_{t_{2025}}^{city}$$

where

$MBO_{t_{2025}}^{city}$ = projected proportion of single households to total households by city in 2025

$\%MBO_{t_{1997}}^{city}$ = estimated proportion of single households to total households by city in 1997

$HHLD_{t_{2025}}^{city}$ = projected total households by city in 2025

$OTHER_{t_{2025}}^{city}$ = projected proportion of other households to total households by city in 2025

$\%OTHER_{t_{1997}}^{city}$ = estimated proportion of other households to total households by city in 1997

2.4 School Enrollment (K-12 school enrollment, college enrollment)

2.4.1 K-12 School Enrollment

2.4.1.1 County

The first step is to compute the county level K-12 public school enrollment rate for 2025 using K-12 public school enrollment projections from the California Department of Finance. The second step is to calculate county level k-12 public school enrollment total by multiplying 2025 projected population by the result of the first step. The third step is to calculate K-12 private school enrollment by applying the ratio of 1997 K-12 private school enrollment to K-12 public school enrollment. The fourth and last step is to add public and private school enrollments.

$$K12PUB_{t_{2025}}^{county} \mid POP_{t_{2025}}^{county} * \%K12PUB_{t_{2025}}^{county}$$
$$K12PRI_{t_{2025}}^{county} \mid K12PUB_{t_{2025}}^{county} * [(K12PRI_{t_{1997}}^{county} / K12PUB_{t_{1997}}^{county})$$

$$K12_{t_{2025}}^{county} \mid K12PUB_{t_{2025}}^{county} \; 2 \; K12PRI_{t_{2025}}^{county}$$

where

$K12PUB_{t_{2025}}^{county}$ = projected K-12 public school enrollment by county in 2025

$K12PRI_{t_{2025}}^{county}$ = projected K-12 private school enrollment by county in 2025

$K12_{t_{2025}}^{county}$ = projected K-12 school enrollment by county in 2025

$POP_{t_{2025}}^{county}$ = projected population by county in 2025

$\%K12PUB_{t_{2025}}^{county}$ = projected crude K-12 public school enrollment by county in 2025

$K12PRI_{t_{2025}}^{county}$ = projected K-12 private school enrollment by county in 2025

$K12PRI_{t_{1997}}^{county}$ = estimated K-12 private school enrollment by county in 1997

$K12PUB_{t_{1997}}^{county}$ = estimated K-12 public school enrollment by county in 1997

2.4.1.2 City

The K-12 public and private school enrollments are projected using the city's 1997 estimated proportion of K-12 school enrollments.

$$K12_{t_{2025}}^{city} \mid POP_{t_{2025}}^{city} * A(\%K12_{t_{1997}}^{city})$$

where

$K12_{t_{2025}}^{city}$ = projected K-12 school enrollments by city in 2025

$POP_{t_{2025}}^{city}$ =projected population by city in 2025

A = adjustment factor

$\%K12_{t_{1997}}^{city}$ = estimated crude school enrollment rate by city in 1997

2.4.2 College Enrollment

2.4.2.1 County

The first step is to compute the projected crude public college enrollment rate for 2025 public college enrollments by the California Department of Finance. Private college enrollments are computed using the 1997 ratio of private college enrollments to the public college enrollments. Aggregation of public and private college enrollments results in total college enrollments.

$$COLPUB_{t_{2025}}^{county} \mid POP_{t_{2025}}^{county} * \%COLPUB_{t_{2025}}^{county}$$

$$COLPRI_{t_{2025}}^{county} \mid COLPUB_{t_{2025}}^{county} * [(COLPRI_{t_{1997}}^{county} / COLPUB_{t_{1997}}^{county})$$

$$COL_{t_{2025}}^{county} \mid COLPUB_{t_{2025}}^{county} \; 2 \; COLPRI_{t_{2025}}^{county}$$

where

$COLPUB_{t_{2025}}^{county}$ = projected college enrollments by county in 2025

$COLPRI_{t_{2025}}^{county}$ = projected private college enrollments by county in 2025

$COL_{t_{2025}}^{county}$ = projected private college enrollments by county in 2025

$POP_{t_{2025}}^{county}$ = projected population by county in 2025

$\%COLPUB_{t_{2025}}^{county}$ = projected crude college enrollment rate for county in 2025

$COLPRI_{t_{2025}}^{county}$ = projected private college enrollment by county in 2025

$COLPRI_{t_{1997}}^{county}$ = estimated private college enrollment by county in 1997

$COLPUB_{t_{1997}}^{county}$ = estimated public college enrollment by county in 1997

2.4.2.2 City

The first step is to compute preliminary crude college enrollment rate using the city's 1997 estimated proportion of college enrollments. The second step is to adjust the preliminary figure using the raking method

$$COLPUB_{t_{2025}}^{city} \mid POP_{t_{2025}}^{city} * \%COLPUB_{t_{2025}}^{city}$$

$$COLPRI_{t_{2025}}^{city} \mid COLPUB_{t_{2025}}^{city} * [(COLPRI_{t_{1997}}^{city} / COLPUB_{t_{1997}}^{city})$$

$$COL_{t_{2025}}^{city} \mid COLPUB_{t_{2025}}^{city} \; 2 \; COLPRI_{t_{2025}}^{city}$$

where

$COLPUB_{t_{2025}}^{city}$ = projected college enrollments by city in 2025

$COLPRI_{t_{2025}}^{city}$ = projected private college enrollments by city in 2025

$COL_{t_{2025}}^{city}$ = projected private college enrollments by city in 2025

$POP_{t_{2025}}^{city}$ = projected population by city in 2025

$\%COLPUB_{t_{2025}}^{city}$ = projected crude college enrollment rate city in 2025

$COLPRI_{t_{2025}}^{city}$ = projected private college enrollment by city in 2025

$COLPRI_{t_{1997}}^{city}$ = estimated private college enrollment by city in 1997

$COLPUB_{t_{1997}}^{city}$ = estimated public college enrollment by city in 1997

3 Workers, Employment and Income Methodology

3.1 Civilian Workers

3.1.1 Workers Estimate for SCAG Region, 1997-2025

The number of workers in the SCAG region is calculated by multiplying the multiple jobholder rate by forecasted employment.

3.1.1.1 Assumptions and Data

- ¢# It was assumed that the number of workers entering the region is equal to the number of workers leaving the region.
- ¢# The multiple jobholders rate (double jobbing rate) in the SCAG region was 5.6% in 1997. This rate was used for all forecast years. This rate is based on an unpublished table of the Current Population Survey for California.
- ¢# The SCAG region employment for the years 1997-2025 was utilized.

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3.1.1.2 Calculation of Regional Workers

Workers (Y) = Employment (Y) / (1.056)

Workers (Y): SCAG workers in year Y
Employment (Y): SCAG employment in year Y

3.1.2 Workers Estimates by City

- ¢# Workers are proportional to the residential population of each city
- ¢# 2000 workers by city based on California Employment Development Department (EDD) labor force data on employment by place of residence
- ¢# City population for 2000-2025 based on SCAG data

3.1.2.1 Calculation of Worker Estimates by City

Because of a difference in definitions, the SCAG estimated regional worker number is different from the EDD estimate. The 2000 city worker totals from EDD are normalized to SCAG 2000 worker controls.

SCAG Workers (a, 2000) = EDD Workers (a, 2000) * SCAG Workers (2000) / EDD Workers (2000)

SCAG Workers (a, 2000): workers to be calculated for city a for year 2000
EDD Workers (a, 2000): EDD data on workers for city for year 2000
SCAG Workers (2000): SCAG estimated regional workers for year 2000
EDD Workers (2000): EDD data on regional workers for year 2000

Workers by city for each interim year are calculated based on the growth of residential population for each city.

SCAG Workers (a, Y) = SCAG Workers (a, 2000) * Res (a, Y) / Res (a, 2000)

SCAG Workers (a, Y): workers to be calculated for city a for year Y
SCAG Workers (a, 2000): calculated workers for city a for year 2000
Res (a, Y): residential population for city a, year Y – SCAG data
Res (a, 2000): residential population for city a, year 2000 – SCAG data

Note – California EDD labor force data

“Employment" found in labor force data reflects the employment status of individuals by "place of residence." Estimates are developed based, in part, on data collected in the Current Population Survey (CPS), or "household survey." The CPS is a sample survey conducted by the Bureau of the Census for the Bureau of Labor Statistics. Civilian Employment includes all individuals who are working, either for a wage or salary job, self-employed, working at least one hour for pay or profit each week, or working at

least 15 unpaid hours in a family business. Those who are on vacation, other kinds of leave, or involved in a labor dispute, are also counted as employed.

3.2 Employment Forecast

3.2.1 SCAG 2025 Total Regional Employment

A Long Range Forecast Workshop was held to review assumptions regarding job growth in the SCAG region. Papers presented by two noted regional economists: Mr. Stephen Levy of the Center for the Study of the California Economy (CCSCE) and Dr. John Husing of Economics and Politics, Inc. evaluated the assumptions regarding job growth in the SCAG region. Mr. Levy's finding was that due to the aging of the baby boom generation, U.S. job growth is expected to slow after 2005. Between 2020 and 2025, most of the working age population growth will be over 65 (prime retirement years). This will push down the U.S. labor force participation rate and growth of total U.S. jobs (according to Bureau of Labor Statistics projections) after 2005. CCSCE assumed slightly higher labor force participation rates resulting in a higher U.S. job growth over the 2005-2020 period.

Mr. Levy also examined the SCAG share of U.S. job growth as part of his analysis. The adopted 2020 regional jobs forecast of 10,573,800 was derived by assuming that the region would capture 15.3% of the 15.5 million U.S. job growth between 2005 and 2020. This is a higher capture rate than has ever occurred in the SCAG region and the share was therefore adjusted downward to 7.8%. This resulted in a regional total of 9.5 million jobs in 2020. He also made a number of recommendations regarding economic and demographic relationships including a population/job ratio of 2.25 for the year 2020. Dr. Husing presented the results of his analysis that are consistent with the CCSCE findings. Copies of both analyses are included as appendices.

As discussed at the forecasting workshop held in December 1999, the new 2020 regional job forecast was developed using the regional share (7.8%) of projected national job growth between 2005 and 2020. The 2020 regional population forecast was developed using a population to job ratio of 2.25, 21.5 million population (849,000 lower than 1998 adopted forecast) and 9.5 million jobs (1 million jobs lower than 1998 adopted forecast). Using the share of growth method based on the growth between 2015 and 2020 and population to jobs ratio (2.31), 2025 forecasts were also developed for population (23 million) and employment (10 million).

3.2.2 SCAG 2025 Total Employment by County

3.2.2.1 2025 Employment by County

The sum of local input that was received was 338,000 jobs lower than the regional total that was projected by SCAG.. In order to maintain the new regional total, it was necessary to reduce employment from local input. Staff calculated the number jobs (population serving and basic) to be reduced from local input for each of the SCAG region counties.

3.2.2.2 Adjustment

SCAG staff conducted a detailed regression analysis of past historical employment trends and Dr. John Husing conducted a detailed examination of the potential for future employment growth in the Inland Empire. The historical analysis indicated that the Los Angeles County share of regional employment declined from 75% in 1972 to 60% in 1999. The Riverside and San Bernardino County share of total regional employment increased from 9% to 14% during the same period. If these trends were projected into the future the Los Angeles County share of total regional employment would decline to only 46% by the year 2025. The Riverside and San Bernardino county shares of total regional employment were projected to increase to 20% by the year 2025.

3.2.2.3 Inland Empire

The share of 2025 Inland Empire employment distributed to Riverside and San Bernardino counties, was based on the share of delta technique for 2005 and 2025.

3.2.2.4 Los Angeles County

The Los Angeles County share of regional employment declined from 75% in 1972 to 60% in 1999. The regression analysis indicated that by 2025 the county's share of regional employment would decline to 46%. The recommended forecast assumed that Los Angeles County's share of regional employment would be 53% by 2025.

3.2.2.5 Orange County

The regression analysis indicated that Orange County's share of regional employment would increase to approximately 28% by the year 2025. SCAG utilized the local input for Orange County representing 20.5% of regional employment in 2025.

No adjustments were made to the county employment controls for either Imperial or Ventura counties.

3.2.3 Employment of SCAG Region & Counties, 1997-2025

3.2.3.1 Employment of SCAG Region, 1997-2025

3.2.3.2 Data

- SCAG 1997, 2020 employment: based on EDD data, converted to total employment from wage and salary employment.
- SCAG 2025 employment of 9.95 million
- SCAG projected population 1997-2025
- Population to jobs ratio: SCAG staff calculated population to jobs ratio for interim years (2005-2020)

3.2.3.3 Calculation of Regional Interim Year Employment

- Employment of SCAG region for each interim years = SCAG population / population to jobs ratio

3.2.3.4 Employment of SCAG Counties, 1997-2025

3.2.3.5 Data

- 1997, 2020 employment for each of six SCAG counties: based on EDD data, converted to total employment from wage and salary employment
- 2025 employment for SCAG counties: as explained above.
- SCAG Region Employment, 1997-2025: as explained above

3.2.3.6 Calculation of County Interim Year Employment

The total employment for each county for each interim year was calculated based on the share of delta technique for 2000 and 2025 data.

3.2.4 Employment by 1-Digit SIC for SCAG Region & Counties, 1997-2025

3.2.4.1 2025 Employment by 1-Digit SIC for SCAG Region

The following are the 1-digit SIC categories:

- Agriculture
- Mining

¢# Construction
¢# Manufacturing
¢# Transportation, Communications and Utilities
¢# Wholesale Trade
¢# Retail Trade
¢# Finance, Insurance and Real Estate
¢# Services
¢# Government

The Center for the Continuing Study of the California Economy (CCSCE) developed a 1-digit SIC employment forecast for SCAG region. The 1-digit SIC employment for 2025 of SCAG region developed by CCSCE was used to develop employment by 1-digit SIC, by each county, for each interim year.

3.2.4.2 Employment by 1-digit SIC of SCAG counties for 2025

3.2.4.3 Regression Analysis to Calculate Shares

SCAG staff conducted regression analysis to analyze the trend in county employment shares for the SCAG region by each 1-digit SIC industry, based on EDD data for the period between 1972 and 1999.

Share (C, I, Y) = Intercept + B (I, C) * Y

Share (C, I, Y): employment share of County C to SCAG total, for industry I, in forecast year Y, 2025,
B (C, I): coefficient for county C, industry I,
Y: forecast year, 2025

For example, the intercept and coefficient of the employment share of Los Angeles County to the SCAG region for the manufacturing industry are 12.1579 and -0.005763 respectively. Therefore, the 2025 employment share of LA to the SCAG region for manufacturing industry is calculated as:

12.1579 + (-0.005763) * (2025) = 0.4873

3.2.4.4 Calculation of Employment for each County by Industry.

Emp (C, I, Y) = Emp (I, Y) * Share (C, I, 2025)

Emp (C, I, Y): employment of county C, industry I, year Y
Emp (I, Y): total SCAG employment of industry I, year Y – data developed by CCSCE

3.2.4.4 Calculation of County 1-digit SIC Employment Share of County Total Employment

Share (I, C, Y) = Emp (C, I, Y) / EMP (T, C, Y)

Share (I, C, Y): employment share of industry I for county C to total county employment in year Y
Emp (C, I, Y): employment of county C, industry I, year Y – derived from the previous step
Emp (T, C, Y): total county employment in year Y – data developed by CCSCE

3.2.4.5 Calculation of 2025 County Employment by 1-Digit SIC

Staff used information from CCSCE and the output of the regression analysis to develop the county 1-digit SIC employment share of total employment by county, and then multiplied the shares by the county employment control to obtain employment for each sector.

Emp (C, I, Y) = Emp (T, C, Y) * Share (I, C, Y)

Emp (T, C, Y): total county employment control in year Y – data developed by SCAG

Total employment by county was used to calculate employment for each sector because it incorporates both local input and trend analysis.

3.2.4.6 Calculation of County Employment by 1-Digit SIC for Interim Years

Data

¢# 2025 county employment by 1-Digit SIC: calculate using the previous procedure
¢# 2000 county employment by 1-Digit SIC: based on California EDD data
¢# 2000-2025 county total employment: explained above

Calculation

1-Digit SIC employment by county for interim years was calculated based on the share of delta technique for the 2000 and 2025 data.

3.2.5 Distribution of Employment at the City Level

3.2.5.1 2025 Total City Employment

Staff reviewed the local input data in order to distribute county employment to the city level. The city employment is distributed based on a two step procedure:

1) The city share of county employment is calculated for each individual city based on data from the local input process.

Share (a, C) = Input (a) / Input (C)

Share (a, C): share of City a employment as a percentage of total county C employment
Input (a): city a employment from local input process
Input (C): county C employment, derived from summation of all city input within the county

2) The city employment is calculated by multiplying the city share by county employment control total.

Emp (a, C) = Emp (C) * Share (a, C)

Emp (a, C): City a employment, within county C
Emp (C): County C employment total control

3.2.5.2 City 1-Digit SIC Employment for Interim Years

City level 1 Digit SIC employment is projected using both the iterative proportional fitting and county share method. The iterative proportional fitting procedure was used for year 2025 because projection for 1 digit SIC jobs at the city level could not be obtained directly, but projections of 1Digit SIC jobs were available at the county level. The county share method was used to develop intermediate year forecasts.

City 1-Digit SIC employment for 2025 is based on 1997 Dun and Bradstreet data. Staff calculated each 1-Digit SIC employment share of the city total for each individual city, and the share was multiplied by calculated city total to get the 2025 1-Digit SIC employment for each city.

Note

- For SCAG modeling purposes, education service and postal service are incorporated into the service

sector. Therefore, the service employment included in the SCAG data will be higher than the data based on the SIC definitions, and government employment will be lower.

3.3 Small Area Median Household Income

Projected compound growth rates are used to develop an income forecast at the county level based on the historical trend of income between 1980 and 1997.

A regression model is run for each county using the census tract as a unit of analysis The relative household income of each census tract to county median household income is used as major independent or dependent variables. The ratio of single households to total households is an additional independent variable. The basic regression formula for obtaining the predicted regression coefficients and intercept for year 1990 is shown as follows:

$$\overline{INC}_{1990}^{tract} \mid a\ 2\ b * INC_{1980}^{tract}\ 2\ c * SPH_{1990}^{tract}$$

Where

a = an intercept

$\overline{INC}_{1990}^{tract}$ = an estimated ratio of 1990 census tract median household income to 1990 county median household income

INC_{1980}^{tract} = an estimated ratio of 1980 census tract median household income to 1980 county median household income

SPH_{1990}^{tract} = the estimated proportion of single occupied housing units

b = regression coefficient for INC_{1980}^{tract}

c = regression coefficient for SPH_{1990}^{tract}

The preliminary estimated ratio of 2000-2030 census tract median income to 2000-2030 county median household income was computed by applying the estimated coefficients in a sequential manner.

$$\overline{INC}_{2000}^{tract} \mid a\ 2\ b * \overline{INC}_{1990}^{tract}\ 2\ c * SPH_{2000}^{tract}$$
$$\overline{INC}_{2010}^{tract} \mid a\ 2\ b * \overline{INC}_{2000}^{tract}\ 2\ c * SPH_{2010}^{tract}$$
$$\overline{INC}_{2020}^{tract} \mid a\ 2\ b * \overline{INC}_{2010}^{tract}\ 2\ c * SPH_{2020}^{tract}$$
$$\overline{INC}_{2030}^{tract} \mid a\ 2\ b * \overline{INC}_{2020}^{tract}\ 2\ c * SPH_{2030}^{tract}$$

The final estimated ratio of 2000-2030 census tract median household income to 2000-2030 county hosuehold income was calculated by using the average of the preliminary estimated ratio and 1990 estimated ratio.

$$INC_{2000}^{tract} \mid (\overline{INC}_{2000}^{tract}\ 2\ INC_{1990}^{tract}) / 2$$
$$INC_{2010}^{tract} \mid (\overline{INC}_{2010}^{tract}\ 2\ INC_{1990}^{tract}) / 2$$
$$INC_{2020}^{tract} \mid (\overline{INC}_{2020}^{tract}\ 2\ INC_{1990}^{tract}) / 2$$
$$INC_{2030}^{tract} \mid (\overline{INC}_{2030}^{tract}\ 2\ INC_{1990}^{tract}) / 2$$

The final estimated ratio is converted into median household income by multiplying the final estimated ratio by projected county median income. The median household income was converted into the weighted average household income for analytical and computational purposes by using the 1990 ratio of county median household income to county weighted mean average household income. The adjusted weighted average household income was converted into the median household income using the 1990 county ratio of median household income to county mean weighted average household income.

4 Summary of Methods for the Development of March 2001 Version of MPU Level Projections

The adopted city growth forecasts are used as control totals for the development of the small area forecast at the MPU (minimum planning unit) level. The MPU is the smallest zone in SCAG's forecasting process.

The delta method is used for the RTP 2001 small area forecasting. This method distributes the share of the city growth (delta) to its each MPU based on the MPU's share of the city's growth.

The ratio of RTP 1998 MPU level delta to its RTP 1998 city forecast delta is the MPU share ratio of its city's RTP 2001 delta.

Formula:

$$R_{ij} \mid (V_{ij}^{t_2} \; 4 \; V_{ij}^{t_1}) / (V_j^{t_2} \; 4 \; V_j^{t_1})$$

where

$$\sum_{i \mid 1}^{n} R_{ij} \mid 1$$

t_1=the base year
t_2=the targeted projection year
V_{ij} =MPU level variable
V_j =city level variable
$R_{I\,j}$= the share ratio at MPU level

The city growth (delta) is distributed to each MPU by the share ratio (R_{ij}). The final MPU projection is based on the following formula:

$$V_{ij}^{t_2} \mid R_{ij} * (V_j^{t_2} \; 4 \; V_j^{t_1}) \; 2 \; V_{ij}^{t_1}$$

If the city growth was negative, as in a few cases with employment, the raking method was used. The 1998 RTP ratio of MPU data to the1998 RTP city level data is utilized to calculate the RTP 2001 distribution for each MPU in the city. The following formula is utilized:

$$V_{ij}^{t_2} \mid V_{ij}^{t_1} / V_j^{t_1} * V_j^{t_2}$$

The variables calculated are residential population, non-institutionalized population, institutionalized population, single occupied household, multiple occupied household, mobile home, other occupied household and 1-digit SIC employment.. The final population, household, and employment are derived from the sum of these variables. These variables are described below:

Population = residential population + non-institutionalized population+institutionalized population
Household =single household+multiple household+mobile home+other household
Employment = the sum of the one digit SIC categories

The ten one digit SIC categories are as follows:

1.) Agriculture
2.) Mining
3.) Construction
4.) Manufacturing
5.) Transportation, Communications and Utilities
6.) Wholesale Trade
7.) Retail Trade
8.) Finance, Insurance and Real Estate
9.) Services
10.) Government

In most cases SCAG used the 1998 RTP as the basis for MPU growth. However, in those cases where detailed local input was provided (such as in Orange County and SANBAG), this data was utilized.

C. 2001 RTP PLAN SOCIOECONOMIC FORECAST

1. Methodology Used for Socio-Economic Forecasts for RTP Aviation Scenarios

SCAG has developed socio-economic forecasts for RTP and PEIR modeling and analysis. The forecasts include one baseline scenario (RTP-Medium scenario) and four alternative scenarios (scenario 2, 6, 8, and 9) for aviation plan. The RTP-Medium scenario is consistent with baseline forecast. Based on the Regional Airport Demand Allocation Modeling (RADAM) analysis, SCAG has developed air passenger travel data for each aviation scenarios by each airport for the year of 2025. In order to analyze transportation and environmental impacts, SCAG has developed a series of socio-economic forecasts for the each aviation scenario. Under each of the four alternative scenarios, variables such as employment, workers, population, and households are redistributed based on the RTP Medium scenario.

1.1 Employment Distribution

Among scenarios, due to differences in future air passenger demand for each airport, job impacts are expected to be different. For example, in 2025 the forecasted demand for LAX is projected to be 70 million air passengers (MAP) for scenario 2, which is less than the estimated 102.7 MAP with the RTP Medium scenario. The 33 MAP reduction for scenario 2 compared to RTP Medium scenario would result in fewer jobs at LAX and its surrounding area. Since SCAG baseline forecast data reflects air passenger demand of RTP-Medium scenario, the jobs in relation to the 33 MAP reduction are reduced from TAZs of baseline data. Those reduced jobs will then be redistributed to the rest of the TAZs.

According to the Aviation Industry Impact Analysis[1], the job impacts related to air transportation services are measured at the following three levels:
Level 1: air transportation service providers (i.e., the air transportation sector),
Level 2: non-resident air traveler expenditures in the region, and
Level 3: linkage to locally produced goods and services that are exported by air

Each level of the impact includes direct impact, and indirect/induced impact. The direct impact is directly associated with the above three levels, i.e., air transportation service (level 1), non-resident air traveler services (level 2), and local production (level 3).

In the analysis, the job impact per MAP is calculated as number of jobs per MAP (jobs/MAP). This includes the following four impact categories:
1) level 1, direct impact,

[1] The Aviation Industry Impact Analysis was conducted by CIC Research, Inc. for SCAG. July 2000.

2) level 2, direct impact,
3) level 3, direct impact, and
4) all indirect and induced impact

The next step is to assign job impacts per MAP from each airport to TAZ by each job type:

1) Level 1, direct impact: assign jobs to the TAZs where the airport is located.

2) Level 2, direct impact: assign jobs to TAZs near the airport. The jobs are assigned proportionally to the number of jobs in each TAZ. The jobs are related to air passenger business and tourism purpose, such as hotels, car rental, and recreation, which are based on 1997 Dunn & Bradstreet data. (Airport to Radam zone: business & non-business tables).

3) Level 3, direct impact: assign export-related jobs to TAZs near the airport. The jobs are assigned proportionally to the basic jobs of each TAZ. (Airport to Radam zone: all cargo tables).

4) All indirect and induced impact: assign jobs to TAZs near the airport. The jobs are assigned proportionally to all jobs of each TAZ.

Sum 1) to 4) get total job impact per MAP to each TAZ by each of the 12 airports (jobs/1 MAP). Since the passenger demand (MAP) for each scenario is known, the difference of airport passenger demand between any aviation scenario and RTP-Medium scenario can be easily calculated. These MAP differences are then multiplied by the job impact per MAP to get total job impact of each TAZ by each airport. The total job impact of each TAZ is calculated by the summation of total job impacts of all 12 airports. The calculated total job impact is the number of jobs need to be adjusted by each TAZ from baseline data (which reflect RTP Medium aviation scenario). The total jobs are then normalized to regional job control total.

1.2 Workers Distribution

The distribution of workers is much easier than job distribution. Home-work trip tables developed by SCAG are utilized to trace the residential location of the workers. The loss of one job results in the loss of one worker.

1.3 Population Distribution

It is assumed that the ratio of residential population to workers for each TAZ remains the same as with baseline forecast data. The new residential population and population is then calculated based on the new worker data.

1.4 Household Distribution

It is assumed that the household size for each TAZ remains the same as with the baseline forecast data. New households data are then calculated based on the new residential population data.

1.5 Detailed Employment and Household Data

In the SCAG socio-economic data, the employment is separated into three variables: retail, service and basic. These variables are developed based on their ratio to total employment from baseline forecast data. The same procedure applies to both single households and multiple households.

2. 2001 RTP Summary

Aviation Scenario 8 was developed and adopted as part of the 2001 Regional Transportation Plan. Aviation Scenario 8 assumed the following number of million annual passengers (MAP) at the SCAG region airports in the year 2025 (with comparison to Baseline):
Los Angeles International Airport (LAX) – 78.0 MAP (vs. 102.7 MAP under Baseline)
El Toro – 29.7 MAP (vs. 24.8 MAP under Baseline)
Ontario International Airport – 30.0 MAP (vs. 16.6 under Baseline)
Burbank Airport – 9.4 MAP (same as Baseline)
Palmdale – 1.7 MAP (vs. 0.3 MAP under Baseline)
John Wayne – 8.4 MAP (same as Baseline)
Long Beach – 3.0 MAP (same as Baseline)
March – 1.7 MAP (vs. 1.0 MAP under Baseline)
Palm Springs – 2.9 MAP (vs. 1.8 under Baseline)
Point Mugu – 0.0 MAP (vs. 2.1 under Baseline)
San Bernardino – 1.8 MAP (vs. 1.0 MAP under Baseline)
Southern California International Airport – 0.8 MAP (vs. 0.3 MAP under Baseline)

Data was developed for this scenario for the years 2010, 2020 and 2025 at the county, subregional, RSA and TAZ levels for the major variables. Tables comparing the plan and baseline have been developed and are included in the data section at the end of the Appendix.

Glossary

TOTAL POPULATION. Total population.

RESIDENT POPULATION. Population not living in group quarters.

INSTITUTIONALIZED GROUP QUARTERED POPULATION. Institutionalized group quarter population. It includes correctional instituions, nursing homes, and mental hospitals.

NONINSTITUTIONALIZED GROUP QUARTERED POPULATION. Noninstitutionalized group quarter population. It consists of students in dormitories, military personnel in barracks, and the population in homeless shelters.

TOTAL HOUSEHOLDS. Total households. Total occupied housing units.

SINGLE OCCUPIED HOUSING UNITS. Single occupied housing units with detached roofs.

MULTIPLE OCCUPIED HOUSING UNITS. Single occupied housing units with attached roofs (condominiums), duplexes, triplexes, and apartments.

MOBILE OCCUPIED HOUSING UNITS. Mobile homes or trailors.

OTHER OCCUPIED HOUSING UNITS. Houseboats, railroad cars, campers, and tents.

WORKERS. Civilian full and part-time employed It includes self-employed. Counted by place of residence.

EMPLOYMENT. Total jobs counted by place of work. Self-employment included.

AGRICULTURE: Agriculture jobs counted by place of work. Self-employment included.

MINING: Mining jobs counted by place of work Self-employment included.

CONSTRUCTION: construction jobs counted by place of work. Self-employment included.

MANUFACTURING: manufacturing jobs counted by place of work. Self-employment included.

TRANSPORTATION, COMMUNICATIONS, UTILITIES: transportation, communications, utilities jobs counted by place of work. Self-employment included.

WHOLESALE TRADE: wholesale trade jobs counted by place of work. Self-employment included.

RETAIL TRADE: retail trade jobs counted by place of work. Self-employment included.

FINANCE, INSURANCE, AND REAL ESTATE: finance, insurance, and real estate jobs counted by place of work. Self-employment included.

SERVICES: service jobs counted by place of work. Self-employment included.

GOVERNMENT: government jobs counted by place of work. Self-employment included.

MEDIAN HOUSEHOLD INCOME. Income from all sources for persons within the household aged 15 years or older. Income is in 1989 dollars.

CRUDE RATE: The rate of any demographic or vital event that is based on an entire population. For example, a crude K-12 enrollment rate can be calculated by dividing the K-2 school enrollment by population.

RAKING: The ratio method is a mathematical technique for adjusting data to sum to a pre-determined total. It consists of multiplying each element of the data by the ratio formed by dividing the desired total by the sum of the data. Applying the ratio method to a data set is referred to as raking.

CENTER FOR CONTINUING STUDY OF THE CALIFORNIA ECONOMY

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DATE: July 6, 1999

TO: Vivianne Doche Boulos

FROM: Stephen Levy

SUBJECT: Summary of Presentation to Regional Forecasting Technical Task Force on June 29, 1999

1. The focus of the presentation was on two issues:

   ① What is a reasonable projection of total jobs for the SCAG region in 2020?

   ② What is a reasonable ratio of population to jobs for SCAG to use in developing a regional population projection for 2020?

2. **The U.S. Context for Job and Population Growth in the SCAG Region**

   The level of job growth in the SCAG region depends on the amount of national job growth and the share of U.S. job growth that will occur in the SCAG region.

   The amount of U.S. job growth in the long term is determined by the growth in the nation's working age (16+) population and the share of working age population in the labor force (labor force participation rates). The first finding relevant to SCAG's long term projections is that **the rate of U.S. job growth will slow after 2005.**

   Most growth in the nation's working age population will occur in the 55+ age groups (Chart 1). The leading wave of the baby boom generation will be 58 in 2005 and the 55+ age groups will fill up with baby boomers for the next 20 years after 2005. Between 2020 and 2025 (the new end year for SCAG's long term analyses) most of the nation's working age population growth will be over 65, i.e., in the prime retirement years (Chart 2).

   Job growth will slow because most workers will move into age groups with much lower force participation rates, i.e., age groups where many people retire (Chart 3). After 2005 the first wave of the baby boom generation will

move from the 45-54 age group where labor force participation is 82% (U.S. Bureau of Labor Statistics projection for 2006) into the 55-64 age group where participation rates fall to 61%. After 2012 this group reaches age 65 where labor force participation rates fall to below 20%.

CCSCE believes that the baby boom generation may work longer and retire later than the previous generation. CCSCE prepared a higher set of labor force participation rates to use in developing job projections for the nation and SCAG (Chart 4).

The movement of people into the retirement age groups will push down the U.S. labor force participation rate and the growth of total jobs after 2005 (Chart 5). Even using CCSCE's higher labor force participation rates for ages 55+, the overall national rate will fall by 2% between 2005 and 2020 and continue falling after 2020.

The result of these analyses are summarized on Chart 6. U.S. job growth between 2005 and 2020 will range from 12 million (using the Bureau of Labor Statistics labor force rates) to 15.5 million using CCSCE's high rate projections. Between 2005 and 2020 the U.S. job growth rate will range from 0.5% per year to 0.7% annually (well below recent growth rates) as baby boom retirements take effect.

U.S. Job Growth Rate (Annual Average)	
1980-1990	1.8%
1990-1998	1.6%
1998-2005	1.1%
2005-2020	
BLS	0.5%
CCSCE	0.7%

3. The SCAG Share of U.S. Job Growth

The SCAG region captured an increasing share of U.S. job growth in the 1960s, 70s, and 80s (Chart 7). Firms in the SCAG region captured 5.7% of new U.S. jobs in the 1960s, 6.3% in the 1970s and 7.1% in the 1980s.

Between 1990 and 1994 job levels in the regions fell while the nation added 5 million jobs. Even with the strong economic recovery underway in the region, it is very unlikely that the regional economy will capture as high a share of U.S. jobs between 1990 and 2005 as in the previous three decades. Based

on the adopted SCAG forecast for 2005 the region will capture 4.6% of U.S. job growth between 1990 and 2005.

The adopted SCAG regional job forecast for 2020 (10,573,600 jobs) implies that firms in the region will capture a record high share of U.S. job growth between 2005 and 2020. The implied SCAG/U.S. share is 15.3% – more than twice as high as the highest recorded long term share as shown on Chart 7.

Two alternative job projections for the SCAG region in 2020 are illustrated on Table 1. The adopted SCAG projection of 10,573,800 is derived by assuming that the region will capture 15.3% of the 15.5 million U.S. job growth between 2005 and 2020. The alternative projection, prepared by CCSCE, assumes that the region will get 7.1% of U.S. job growth – the high historical share as shown on Chart 7 – which results in 9,306,100 jobs in 2020.

4. **First Choice Facing SCAG**

The first choice facing SCAG decision makers is whether to revise downward the existing 2020 job projection of 10,573,800.

5. **Deriving a Population Projection From the Job Projection**

There are three major factors that link job and population projections as illustrated on Table 2:

1) The labor force/job ratio

2) The labor force participation rate

3) The share of total population aged 16 and above

For a given level of jobs:

1) **Higher** labor force participation rates result in a **lower** projected population because a smaller population is needed to produce the required labor force.

2) A **higher** share of population 16+, results in a **lower** total population because there are fewer children per worker.

3) A **lower** labor force/job ratio results in a **lower** projected total population primarily because there are fewer unemployed workers.

CCSCE projected a ratio of 2.253 persons per job for the SCAG region in 2020 using the following assumptions:

1) A labor force/job ratio of 1.08. Charts 8 and 9 show the recent history for labor force and jobs in the region. Since 1991 the labor force/job ratio has been over 1.08 as the region has had relatively high unemployment rates. The projected ratio of 1.08 implies a continued lowering of unemployment rates. The lower projected ratio implies a slightly lower total population projection than using the current ratio of 1.10.

2) SCAG has projected a regional labor force participation rate of 62.8% in 2020. CCSCE raised the projection to 64% to be consistent with CCSCE's national assumption of rising participation rates in the older age groups. The effect of using the higher labor force rates is to lower the projection of total population.
3) SCAG projected that 74.9% of the region's population will be 16+ in 2020. By comparison DOF has projected somewhat higher birth rates which result in approximately 71% of the population over 16. Using the SCAG birth projections results in a lower total population for any given projection of total jobs..

The result of using these three assumptions is that the population/job ratio for the SCAG region in 2020 is 2.253 as illustrated on Table 3.

6. Second Choice Facing SCAG

Currently SCAG decisionmakers are considering regional population projections of 21.3 to 21.8 million to go with the job projection of 10.6 million. The adopted (4/98) regional population projection is 22.4 million. The 21.3 to 21.8 million range reflects input from local decisionmakers that higher rates of housing growth are not possible or not desired.

All of these 2020 population projections are lower than the 23.8 million that CCSCE projects will be consistent with SCAG's adopted 2020 job projection.

CCSCE believes that the lower population projections are not consistent with the projected regional job growth. Either the job projection needs to be lowered or the regional population projection needs to be raised or some combination of both in order to achieve consistency.

The SCAG population projections show a drop in the regional population/job ratio after 2005. This drop is in the opposite direction from the increase projected in the nation and in the CCSCE regional population projection for 2020.

A comparison of projected population/job ratios is shown on Table 4 and Charts 10-13.

The first fact to notice is that the ratios for the SCAG region are significantly higher than for the nation in both 1998 and 2005. The primary reason is the higher share of children in the regional population as a result of higher than average birth rates.

After 2005 the population/job ratio rises in the nation. These are more people per job because the retirement of the baby boom generation raises the ratio of adults who are not in the labor force. As shown in Chart 10 the ratio rises from 1.92 in 2005 to 1.96 in 2020 ad 2.01 in 2025.

The CCSCE population/job ratio (Chart 11) follows the same trend as the U.S. – 1) down from 1998 to 2005 and 2) up between 2005 and 2020 and from 2020 to 2025.

The SCAG adopted regional population projection for 2020 (22.4 million) implies a substantial drop in the population/job ratio between 2005 and 2020 (Chart 12). The SCAG interim population projection series (21.8 million in 2020) implies an even larger drop in the population/job ratio to 2020 and another drop to 2025 (Chart 13).

The second choice for SCAG decisionmakers is whether to raise the projected population/job ratio to be consistent with the trends in the ratio projected by BLS and CCSCE.

7. Additional Discussion

At the Technical Task Force meeting we discussed the connection between planned housing growth and projected job growth in the SCAG region.

It is very likely that lower levels of new housing resulting from local growth limitation decisions will reduce the attractiveness of the region for job growth. Business leaders throughout California now cite housing availability and affordability along with school quality as the leading obstacles to attracting talented workers.

The SCAG region already has high relative housing prices and low levels of new housing production. Further restraints on new housing, even if adopted for sound planning reasons, will eventually restrict future job growth.

Chart 1

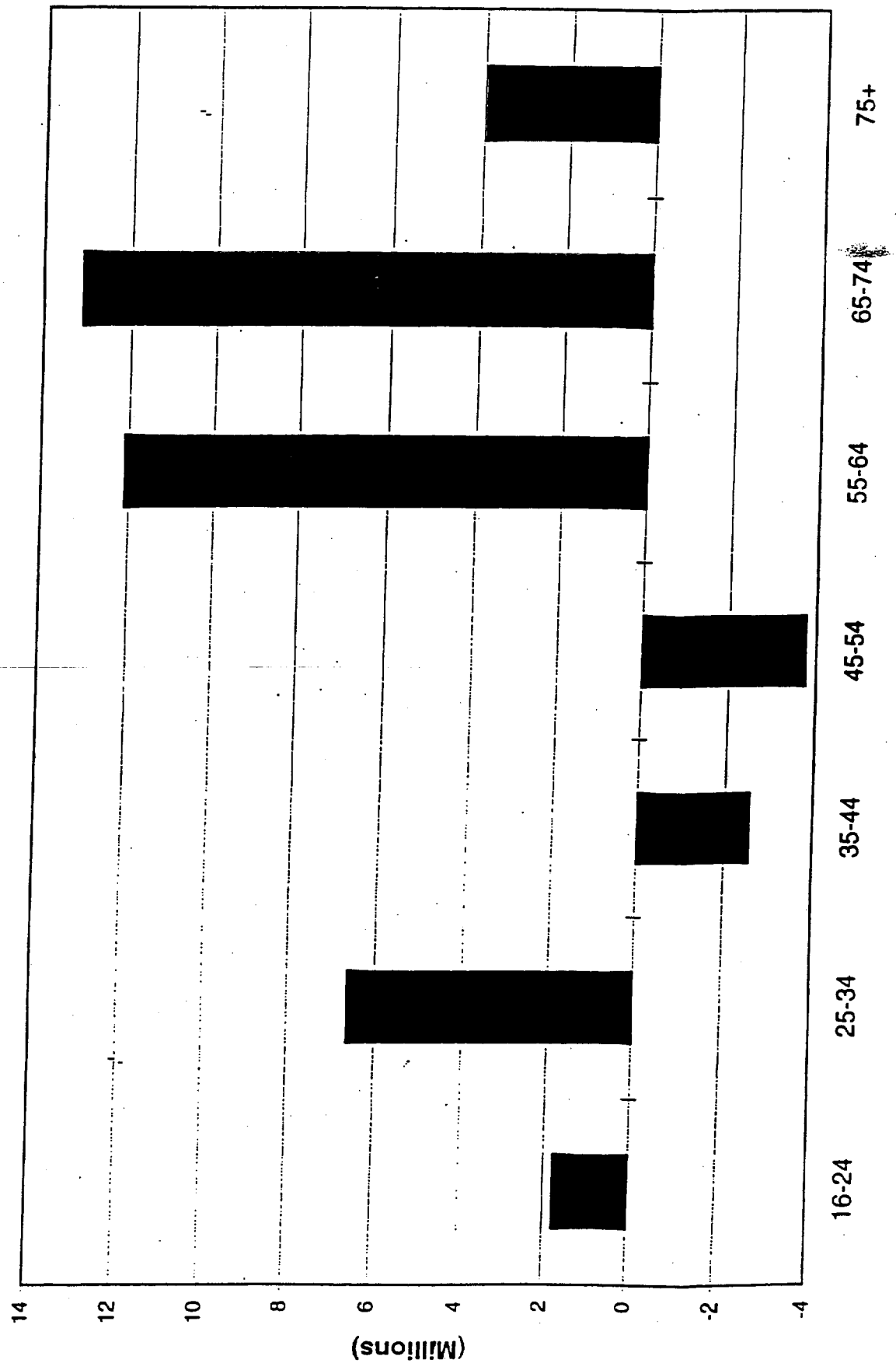

U.S. Population Change 2005-2020
(Millions)
14
12
10
8
6
4
2
0
-2
-4
16-24
25-34
35-44
45-54
55-64
65-74
75+

Chart 2

U.S. Population Change 2020-2025

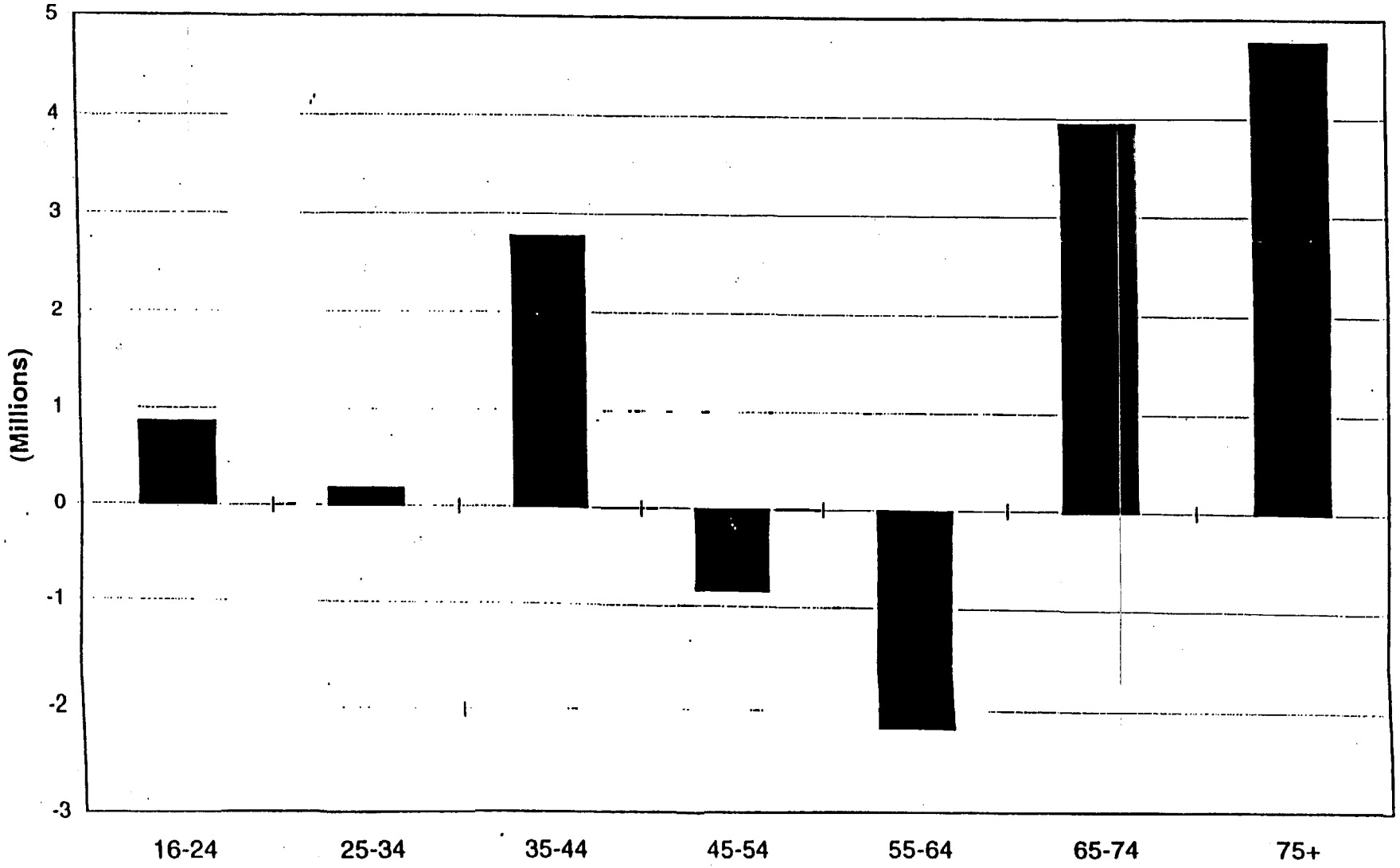


Chart 3

U.S. Labor Force Participation Rates in 2006

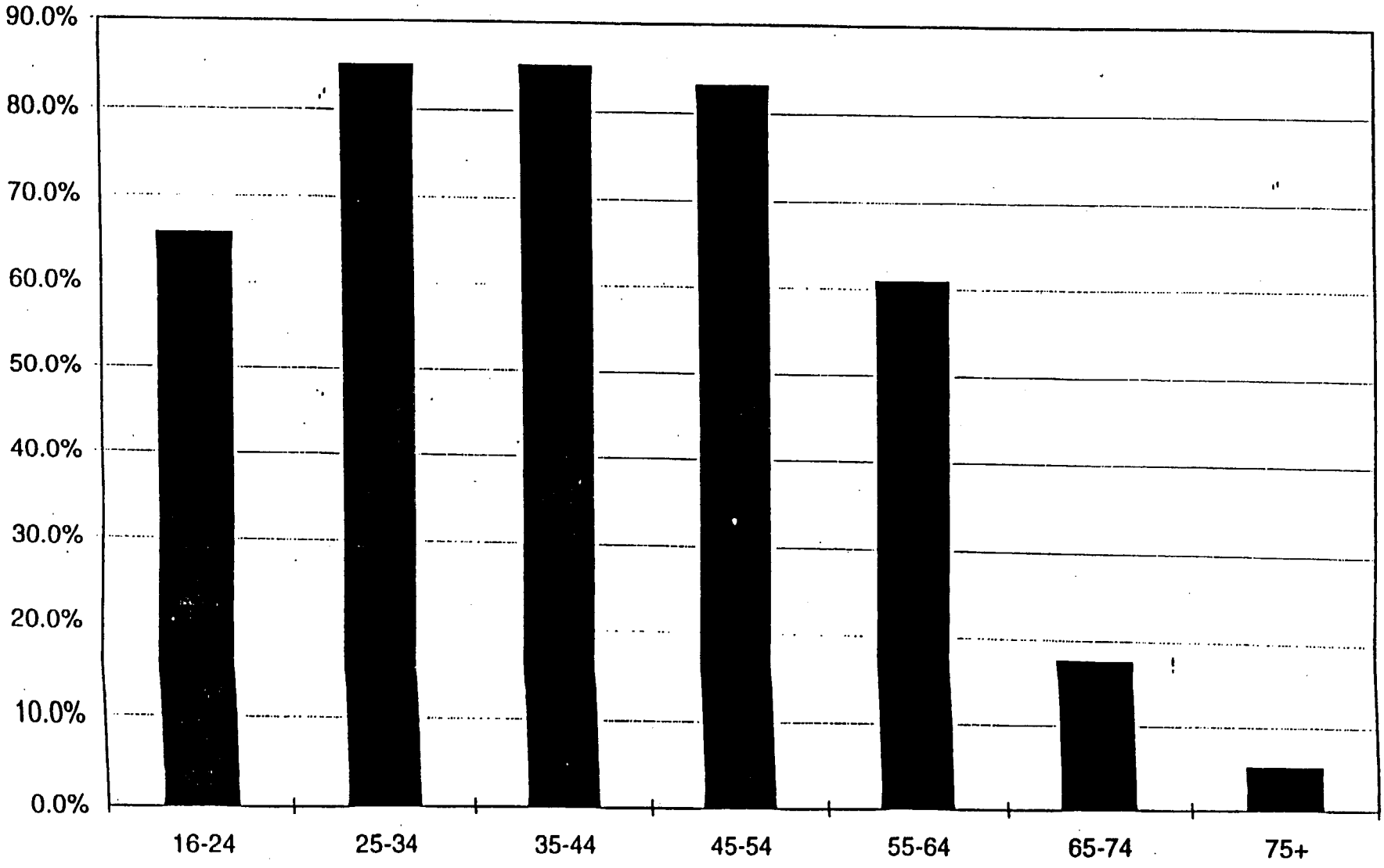
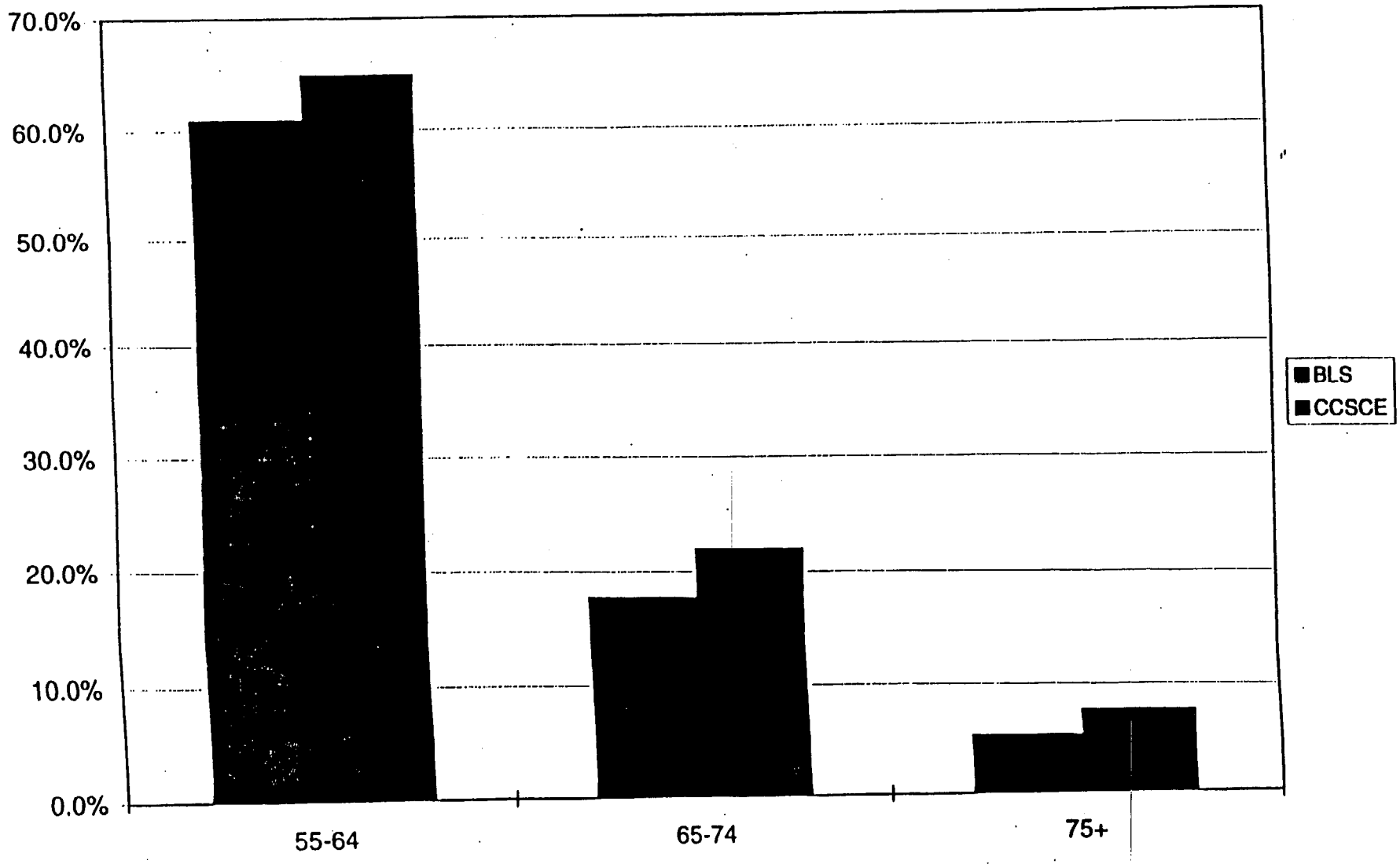


Chart 4

U.S. Labor Force Participation Rates in 2020



U.S. Total Labor Force Participation Rate

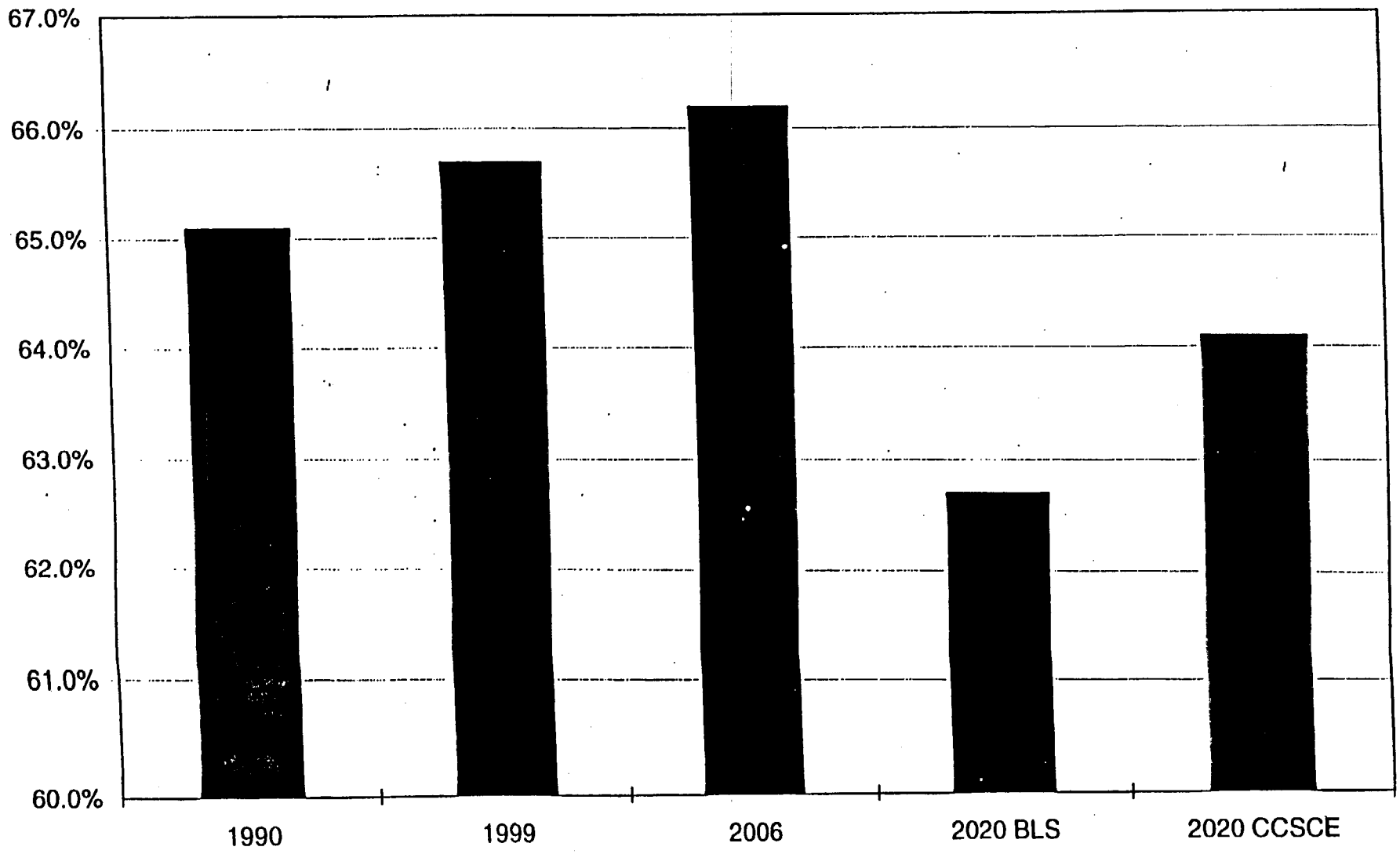


Chart 6

U.S. Job Growth Using Different LFPRs

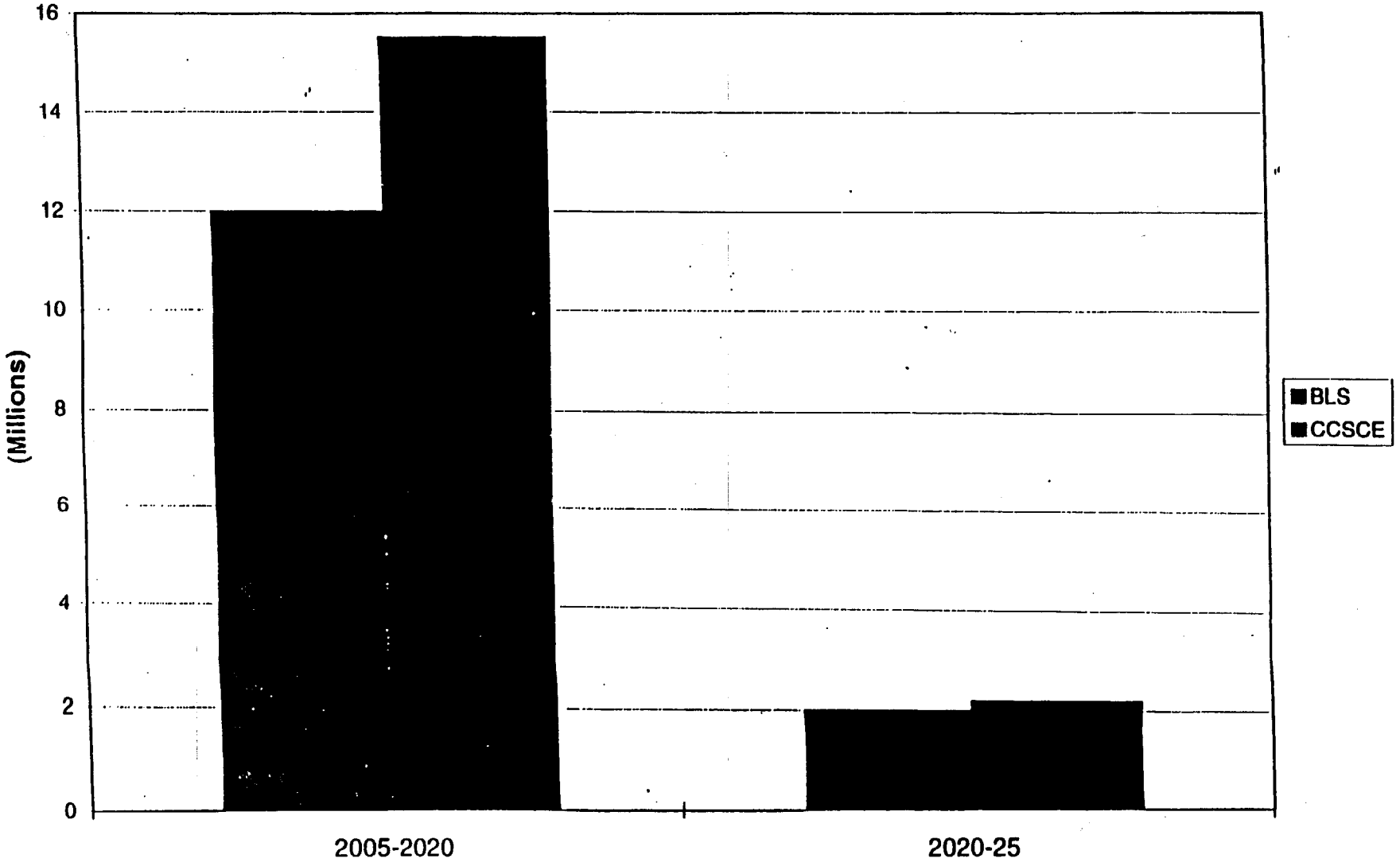


Table 1

SCAG Job Projections

2005	8,205,600	
U.S. Growth 2005-2020	15,500,000	
SCAG Share of U.S. Growth	7.1%	15.3%
SCAG Job Growth	1,100,500	2,371,500
SCAG Jobs in 2020	9,306,100	10,573,800

Table 2

Job – Population Linkages for SCAG Region 2020

Labor Force/Jobs Ratio	1.08
Labor Force Participation Rate	64%
16+ Share of Total Population	74.9%
Population/Job Ratio	2.253

Chart 7

SCAG Share of U.S. Job Growth

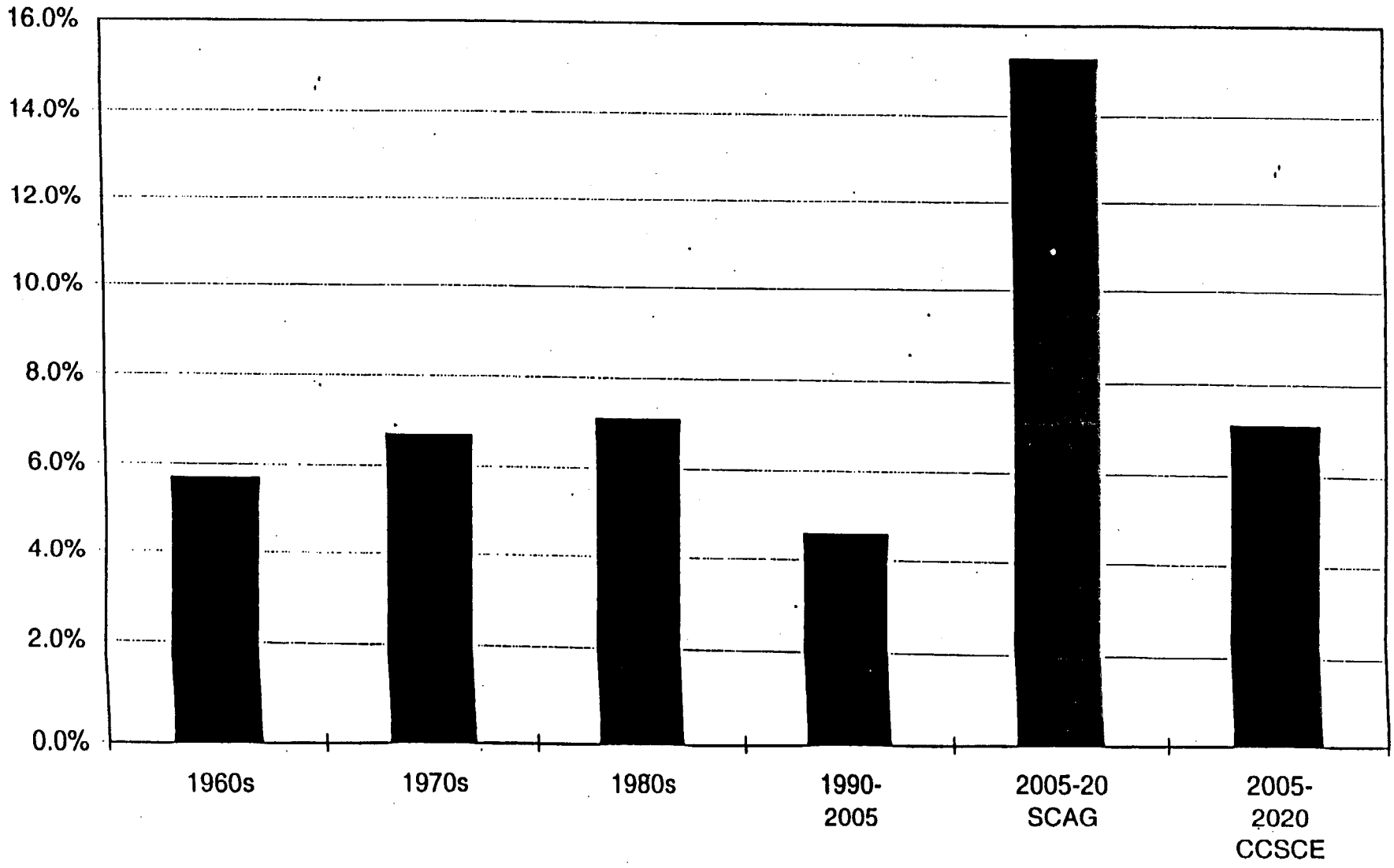


Chart 8

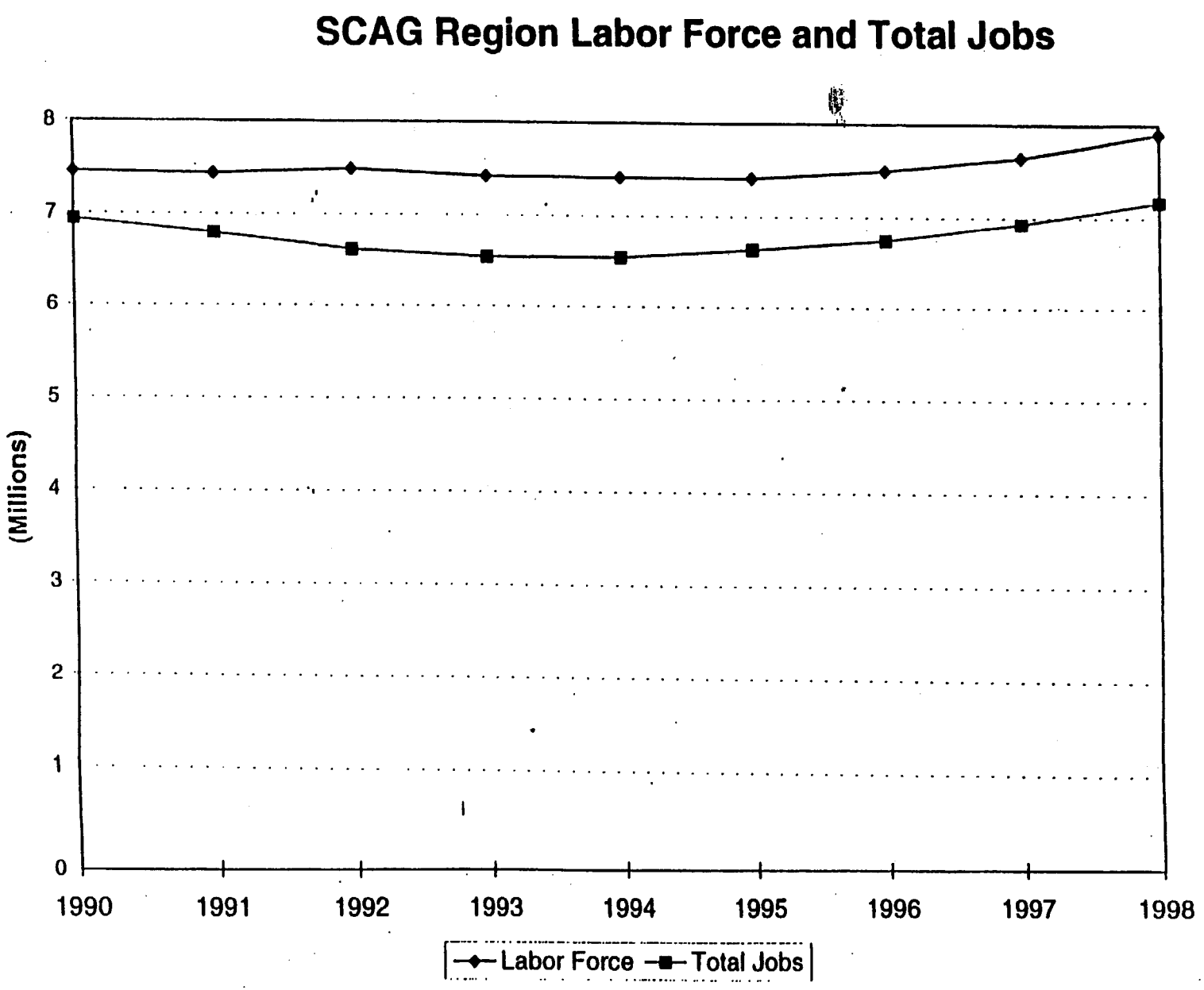

SCAG Region Labor Force and Total Jobs
(Millions)
8
7
6
5
4
3
2
1
0
1990
1991
1992
1993
1994
1995
1996
1997
1998
Labor Force
Total Jobs

Table 3

Projections of SCAG Population in 2020

	SCAG Jobs	CCSCE
Total Jobs	10,573,800	9,306,100
Labor Force (x1.08)	11,419,700	10,050,600
Population 16+ (÷ .64)	17,843,300	15,704,100
Total Population (÷ 749)	23,822,800	20,966,600

Chart 9

SCAG Region Ratio of Labor Force to Jobs

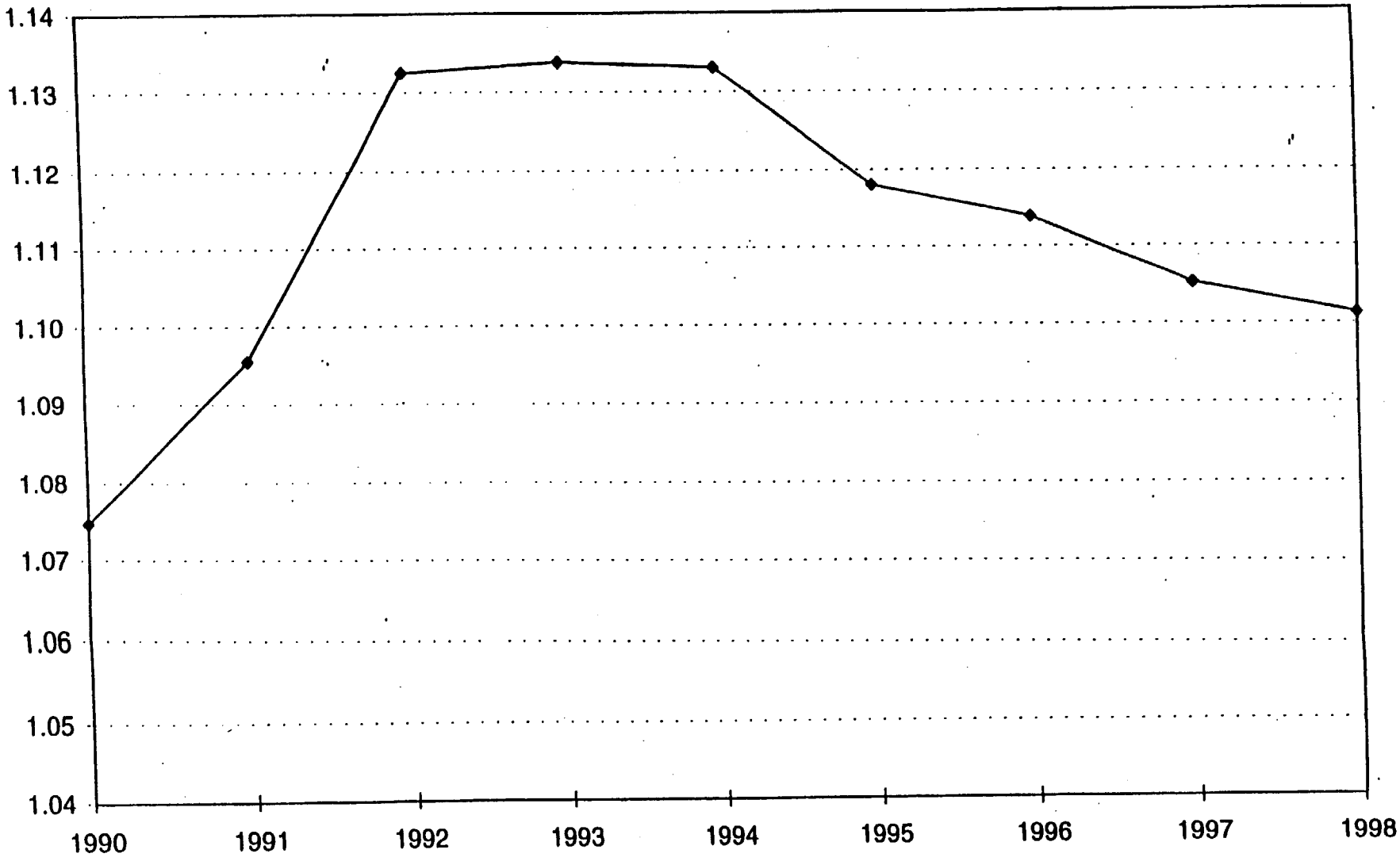


Table 4

Ratio of Population to Jobs

	1990	1998	2005	2020	2025
U.S.	2.04	1.95	1.92	1.96	2.01
SCAG - Adopted	2.12	2.29	2.22	2.11	
SCAG Interim	2.12	2.29	2.22	2.05	2.02
SCAG CCSCE	2.12	2.29	2.22	2.25	2.31

Chart 10

U.S. Population/Job Ratio

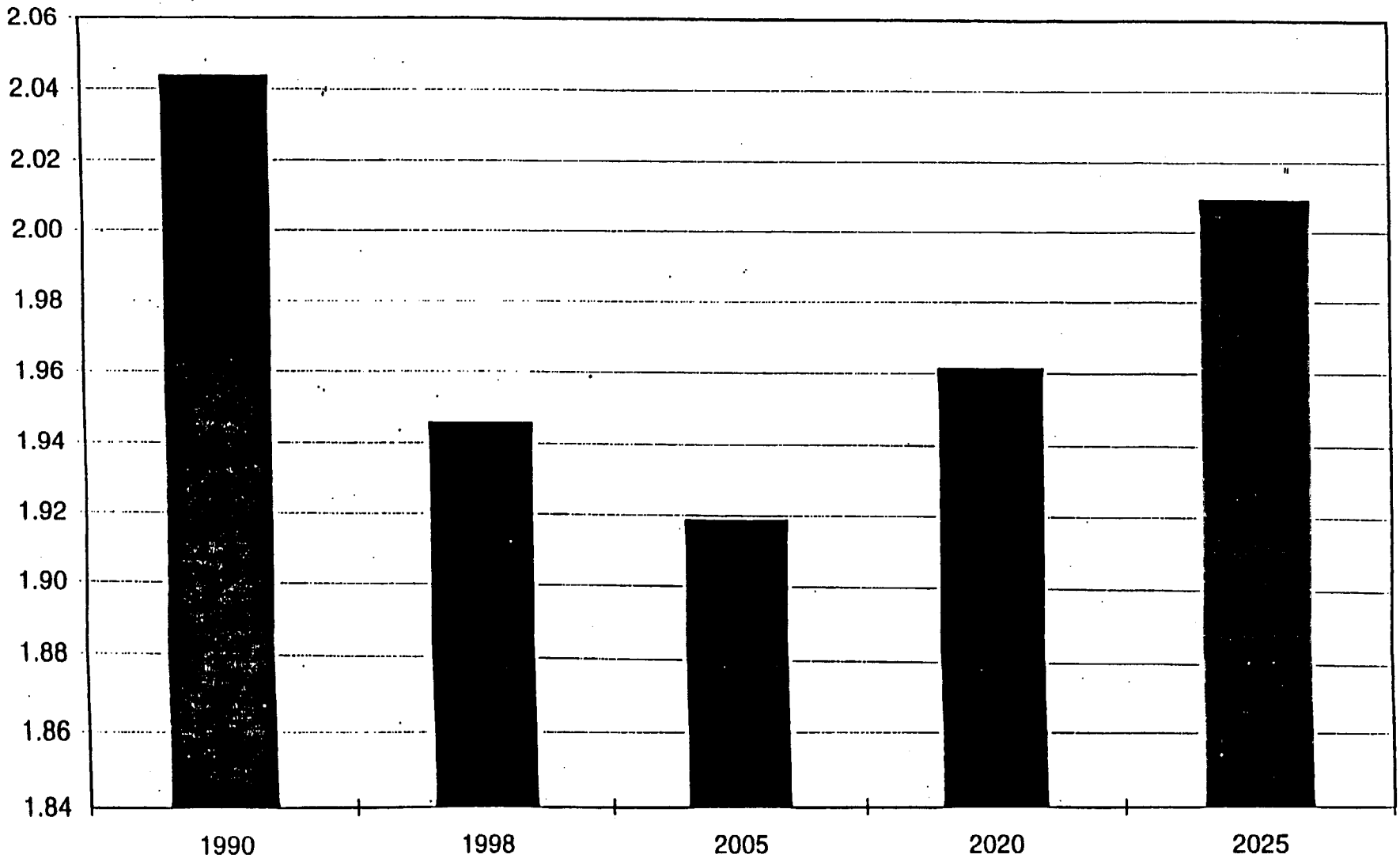


Chart 11

CCSCE Population/Job Ratio for SCAG Region

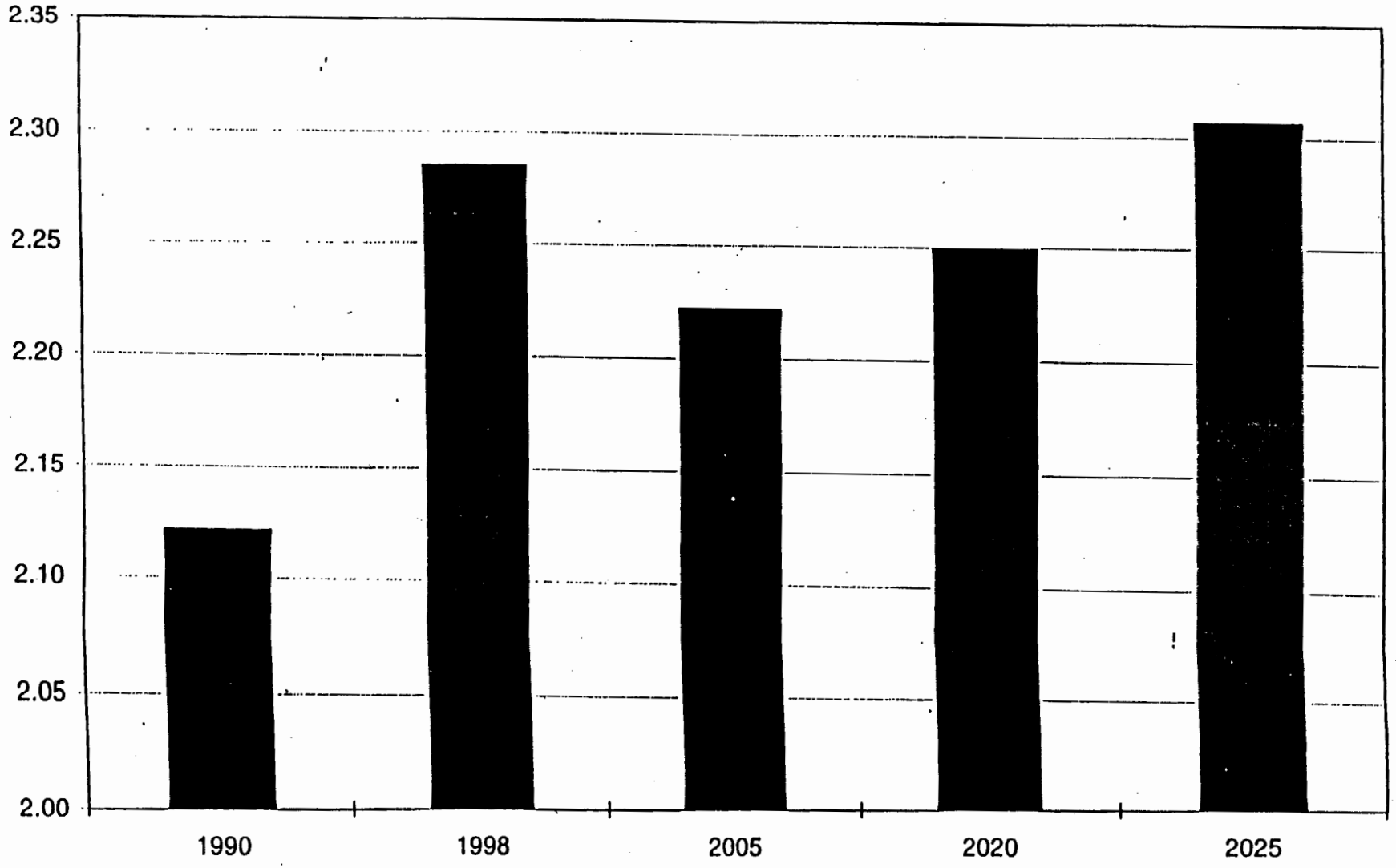


Chart 12

SCAG Adopted Series Population/Job Ratio

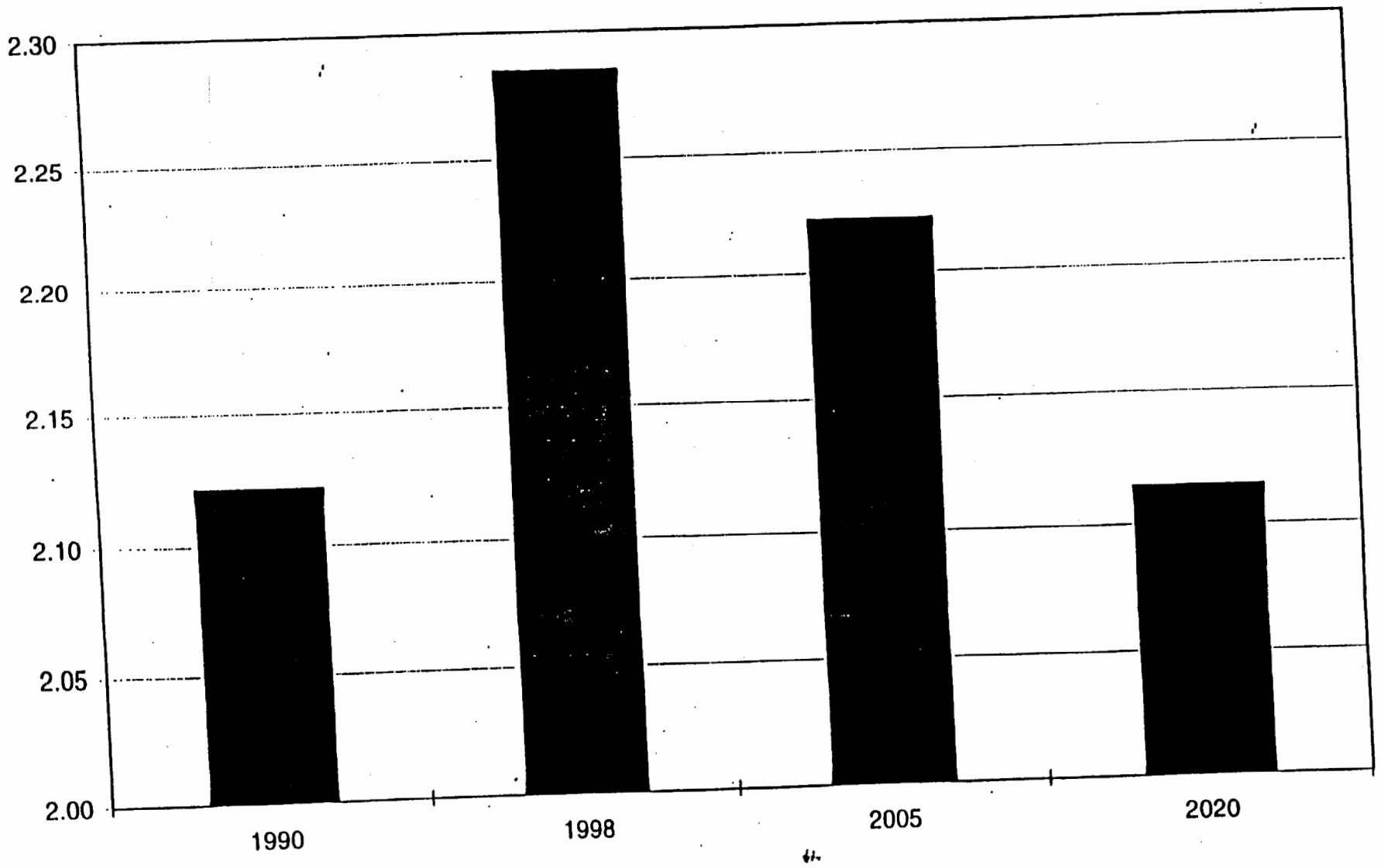
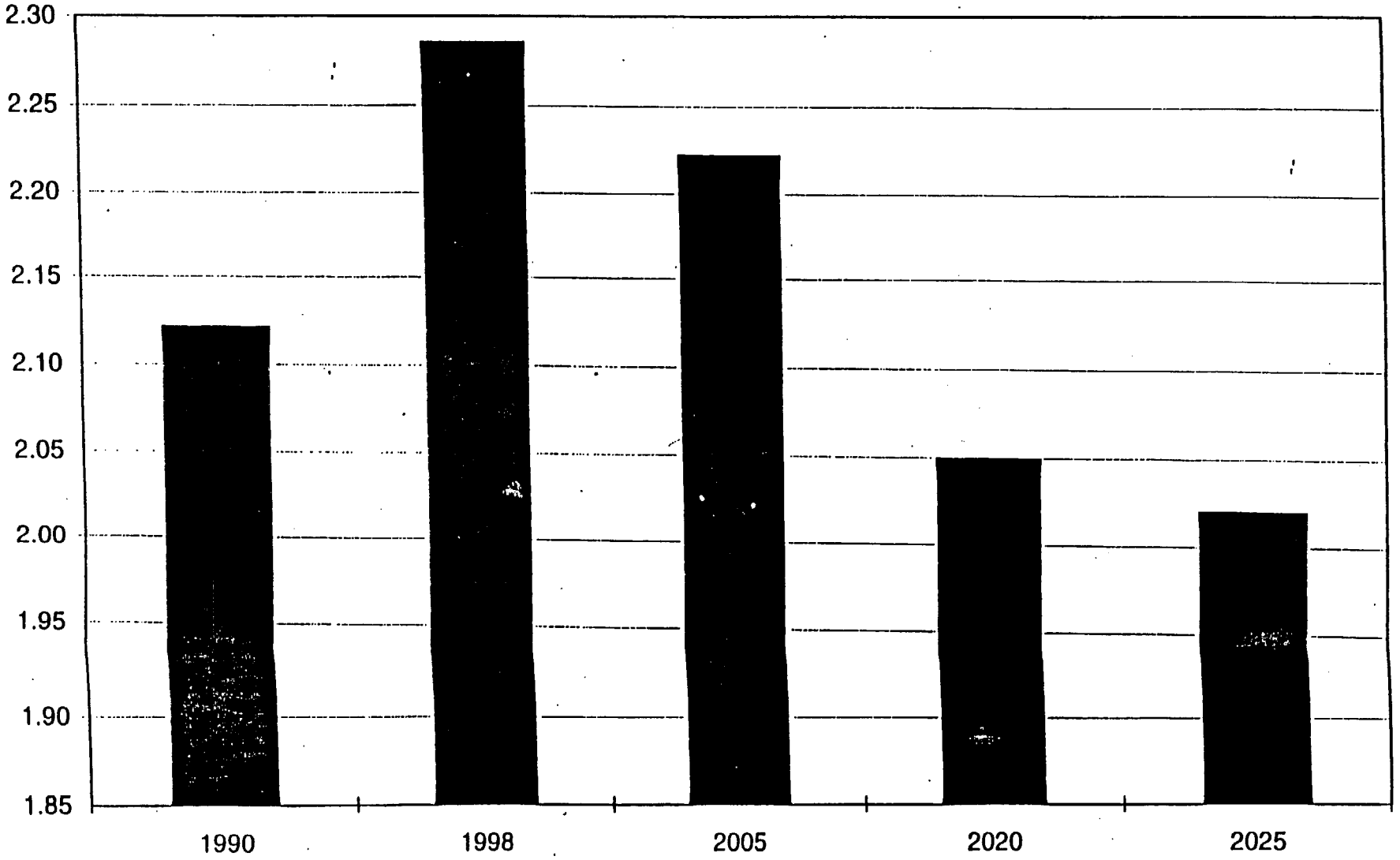


Chart 13

SCAG Interim Series Population/Job Ratio



2001 RTP Baseline Forecast, April 2001

Note: numbers rounded to nearest 1,000

	Population					
County	**1997**	**2005**	**2010**	**2015**	**2020**	**2025**
Imperial	142,000	184,000	214,000	242,000	277,000	318,000
Los Angeles	9,537,000	10,363,000	10,784,000	11,198,000	11,759,000	12,338,000
Orange	2,700,000	3,006,000	3,169,000	3,271,000	3,344,000	3,416,000
Riverside	1,419,000	1,814,000	2,031,000	2,245,000	2,534,000	2,834,000
San Bernardino	1,613,000	1,855,000	2,032,000	2,239,000	2,487,000	2,787,000
Ventura	726,000	765,000	836,000	875,000	915,000	951,000
Total	16,137,000	17,988,000	19,066,000	20,069,000	21,316,000	22,644,000

2001 RTP Baseline Forecast, April 2001

Note: numbers rounded to nearest 1,000

	Households					
County	**1997**	**2005**	**2010**	**2015**	**2020**	**2025**
Imperial	38,000	50,000	61,000	71,000	83,000	98,000
Los Angeles	3,071,000	3,252,000	3,444,000	3,638,000	3,862,000	4,119,000
Orange	888,000	967,000	1,011,000	1,034,000	1,050,000	1,068,000
Riverside	463,000	570,000	653,000	732,000	829,000	934,000
San Bernardino	509,000	583,000	641,000	709,000	789,000	890,000
Ventura	233,000	252,000	271,000	284,000	297,000	309,000
Total	5,201,000	5,674,000	6,081,000	6,468,000	6,912,000	7,418,000

2001 RTP Baseline Forecast, April 2001

Note: numbers rounded to nearest 1,000

	Employment					
County	**1997**	**2005**	**2010**	**2015**	**2020**	**2025**
Imperial	56,000	76,000	83,000	87,000	90,000	94,000
Los Angeles	4,303,000	4,655,000	4,890,000	5,029,000	5,156,000	5,291,000
Orange	1,323,000	1,668,000	1,797,000	1,897,000	1,975,000	2,044,000
Riverside	432,000	642,000	777,000	856,000	929,000	1,006,000
San Bernardino	540,000	715,000	852,000	933,000	1,007,000	1,086,000
Ventura	294,000	351,000	381,000	398,000	414,000	432,000
Total	6,948,000	8,107,000	8,779,000	9,200,000	9,572,000	9,952,000

2001 RTP Plan Forecast, April 2001

Note: numbers rounded to nearest 1,000

	Population					
County	**1997**	**2005**	**2010**	**2015**	**2020**	**2025**
Imperial	142,000	184,000	214,000	242,000	277,000	318,000
Los Angeles	9,537,000	10,363,000	10,769,000	11,171,000	11,720,000	12,277,000
Orange	2,700,000	3,006,000	3,164,000	3,225,000	3,355,000	3,431,000
Riverside	1,419,000	1,814,000	2,040,000	2,289,000	2,548,000	2,856,000
San Bernardino	1,613,000	1,855,000	2,046,000	2,281,000	2,510,000	2,821,000
Ventura	726,000	765,000	833,000	861,000	906,000	940,000
Total	16,137,000	17,988,000	19,066,000	20,069,000	21,316,000	22,644,000

2001 RTP Plan Forecast, April 2001

Note: numbers rounded to nearest 1,000

	Households					
County	**1997**	**2005**	**2010**	**2015**	**2020**	**2025**
Imperial	38,000	50,000	61,000	71,000	83,000	98,000
Los Angeles	3,071,000	3,252,000	3,439,000	3,627,000	3,848,000	4,098,000
Orange	888,000	967,000	1,010,000	1,022,000	1,054,000	1,073,000
Riverside	463,000	570,000	656,000	744,000	834,000	942,000
San Bernardino	509,000	583,000	645,000	724,000	797,000	901,000
Ventura	233,000	252,000	270,000	280,000	295,000	306,000
Total	5,201,000	5,674,000	6,081,000	6,468,000	6,912,000	7,418,000

2001 RTP Plan Forecast, April 2001

Note: numbers rounded to nearest 1,000

	Employment					
County	**1997**	**2005**	**2010**	**2015**	**2020**	**2025**
Imperial	56,000	76,000	83,000	87,000	90,000	94,000
Los Angeles	4,303,000	4,655,000	4,881,000	5,024,000	5,134,000	5,259,000
Orange	1,323,000	1,668,000	1,794,000	1,887,000	1,982,000	2,053,000
Riverside	432,000	642,000	780,000	861,000	934,000	1,014,000
San Bernardino	540,000	715,000	860,000	945,000	1,021,000	1,104,000
Ventura	294,000	351,000	380,000	397,000	411,000	428,000
Total	6,948,000	8,107,000	8,779,000	9,200,000	9,572,000	9,952,000